

UNITED STATES DISTRICT COURT
WESTERN DISTRICT OF WASHINGTON
AT TACOMA

BRANDON AUSTIN, individually,

Plaintiff,

vs.

HARBOR FREIGHT TOOLS USA, INC., a
foreign corporation; and JOHN DOES 1-5,

Defendants

No. 3:17-cv-06028-BHS

**PLAINTIFF'S DISCLOSURE OF
EXPERT TESTIMONY UNDER
FRCP 26(a)(2)**

I. INTRODUCTION

COMES NOW Plaintiff Brandon Austin, by and through his attorneys, Darrell L. Cochran, Nicholas B. Douglas, and Pfau Cochran Vertetis Amala and submits the following disclosures under Rule 26(a)(2)(A) and (B) and this Court's Minute Order Setting Trial, Pretrial Dates, and Ordering Mediation.

Plaintiff expressly reserves the right to call named witnesses as part of their case-in-chief and as rebuttal expert witnesses, and further reserves the right to determine that she will not call one or more of the following witnesses at trial. This disclosure is based on currently available information and in reasonable anticipation of the theories of liability and damages of Plaintiff. Plaintiff expressly reserves the right to add additional witnesses or witness testimony

PLAINTIFF'S DISCLOSURE OF EXPERT
TESTIMONY UNDER FRCP 26(a)(2)



911 Pacific Avenue, Suite 200
Tacoma, WA 98402

Phone: (253) 777-0799 Facsimile: (253) 627-0654

as facts become known in discovery. Plaintiff also expressly reserves the right to call all witnesses disclosed by any other party to this litigation.

These expert witnesses will be made available for deposition. The sole purpose for which they may be deposed is that of defense counsel acquainting themselves with their opinions and conclusions.

II. PLAINTIFF'S EXPERT WITNESSES

1. Dr. Virtaj Singh, M.D.
Seattle Spine & Sports Medicine
3213 Eastlake Ave East, Ste. A-1
Seattle, WA 98102

A. Statement of all opinions that will be expressed.

The opinions Dr. Singh will express are summarized in his expert report, appended hereto as **Exhibit 1**. Dr. Singh's opinions and conclusions will be further refined pending review of additional records or testimony, and he may be offering rebuttal opinions to those put forth by Defendants' experts. Plaintiff will supplement as needed according to the FRCP.

B. Facts or data considered.

Dr. Singh has specialized training, background, and expertise as a board-certified physiatrist with subspecialty board certification in Pain Medicine. He has reviewed the medical records, images, and bills produced in this matter through stipulation and has evaluated Plaintiff. The facts and data considered are also set forth in his report.

C. Exhibits that will be used to summarize or support opinions.

Plaintiff anticipates using Dr. Singh's report, medical bills, and medical records, including imaging, during his trial testimony to summarize or support his opinions. Plaintiff will supplement as needed according to the FRCP.

D. Witnesses' qualifications, including a list of publications.

Dr. Singh's qualifications and list of publications is provided in his CV appended as **Exhibit 2**.

E. A list of other cases that have been testified to in the last four years.

A listing of Dr. Singh's testimony over the course of the past four years is attached as **Exhibit 3**.

F. Statement of compensation to be paid for study and testimony in the case.

Dr. Singh's fee schedule is attached as **Exhibit 4**. To date, Plaintiff has paid \$1,725.00 in professional fees for Dr. Singh.

2. Dr. Jesse A. Grantham
Welding & Joining Management Group
3756 Monarch St.
Frederick, CO 80516

A. Statement of all opinions that will be expressed.

The opinions Dr. Grantham will express are summarized in his expert report, appended hereto as **Exhibit 5**. Dr. Grantham's opinions and conclusions will be further refined pending review of additional records or testimony, and he may be offering rebuttal opinions to those put forth by Defendants' experts. Plaintiffs will supplement as needed according to the FRCP.

B. Facts or data considered.

Dr. Grantham has specialized training, background, and expertise as an expert in engineering. He will testify regarding the failure of the subject torch in this matter. His opinions and testimony will be based upon his education, training, knowledge and expertise, as well as his review of the records in this case.

C. Exhibits that will be used to summarize or support opinions.

Plaintiffs anticipate using illustrative or demonstrative exhibits during Dr. Grantham's trial testimony to summarize or support his opinions. Plaintiff will supplement as needed according to the FRCP.

D. Witnesses' qualifications, including a list of publications.

Dr. Grantham's qualifications and list of publications is provided in his CV appended as **Exhibit 6**.

E. A list of other cases that have been testified to in the last four years.

A listing of Dr. Grantham's testimony over the course of the past four years is attached as **Exhibit 7**.

F. Statement of compensation to be paid for study and testimony in the case.

Dr. Grantham's fee schedule is attached as **Exhibit 8**.

RESPECTFULLY SUBMITTED this 14th day of January, 2019.

PFAU COCHRAN VERTETIS AMALA, PLLC

By /s/ Darrell L. Cochran

Darrell L. Cochran, WSBA No. 22851

Nicholas B. Douglas, WSBA No. 49786

Attorneys for Plaintiff

CERTIFICATE OF SERVICE

I, **Nicholas Douglas**, hereby declare under penalty of perjury under the laws of the State of Washington and the United States of America that I am employed at Pfau Cochran Vertetis Amala PLLC and that on today's date, I served the foregoing via the Court's Electronic Service System by directing delivery to the following individuals:

Robert Spajic
GORDON & POLSCER, LLC
9755 S.W. Barnes Rd. Suite 650
Portland, OR 97225
(503) 242-2922
bspajic@gordon-polscer.com

DATED this 14th day of January, 2019.

/s/ Nicholas Douglas
Nicholas Douglas

EXHIBIT 1

Virtaj Singh, MD
Physical Medicine & Rehabilitation

SEATTLE SPINE & SPORTS MEDICINE

3213 Eastlake Ave East, Suite A Seattle, WA 98102

206-861-8200 (W) 206-324-1178 (F)

On-line at seattlespine.com

Name & Date: Austin, Brandon 10-22-18

CLINICAL EVALUATION

Brandon Austin is a 28-year-old male, who has a problem dating back to August 2017. He currently has a **chief complaint** of ongoing anxiety. He is referred by his attorney, Darrell Cochran, JD, for further evaluation.

Concerning onset of symptoms, the patient reports they date back to a burn injury in August 2017. At that time, patient reports that he had just purchased a new propane torch and had been testing it for 20 minutes before he went out to the back yard to try and burn some weeds. Patient reports that he suddenly heard the air compression hose leaking and then was suddenly engulfed in what he describes as a “flash fire.” He reports that he immediately had burns to his arms and to the left-side of his face. He describes himself as initially being in a state of “shock.” He reports that he tried to roll around on the ground to put the burns out. He then realized that the propane tank was still going and had to work to turn it off. He reports that as soon as he successfully turned off the propane tank he felt an immense pain in his arms, hands, and face. He reports that he did not quite know what to do and ran into a shower to pour water on himself.

He called his fiancée who called 911, which he states arrived within 10 minutes. Patient reports that he was initially taken to Good Samaritan Hospital and then transferred to Harborview Hospital. At Harborview, he states that they were “scrubbing my skin” for the next several hours. He was admitted overnight and discharged the next day after his fiancée was taught how to perform his wound care. He reports that, for the next 1.5 months, his fiancée had to do his wound care which he describes as “extremely painful.” However, he reports that since that time he is essentially now pain-free. He reports that he can still sense a discoloration in the skin but, otherwise, feels as if he is doing much better from a physical standpoint.

However, he reports that there is persistent psychological impact as discussed below. He is here today for further evaluation. Of note, please see **Available Medical Records** below for details of patient’s history to date.

Pre- and Post-Existing Conditions (Including Comprehensive Chart Review)

Patient reports no prior history of mental health issues, including PTSD. He reports no prior history of injuries to his skin or arms. He reports that since the injury in question he has had no major injuries. He does report that he had one injury prior to the burn injury, which was a nail gun that apparently went through his left thumb, but he states that he made a full recovery and did not require any intervention for this.

Review of Available Medical Records:

08/25/17	<p>GOOD SAMARITAN HOSPITAL (63 pages)</p> <p>08/25/17: Billing records are reviewed.</p> <p>08/25/17: Emergency department note is reviewed.</p> <ul style="list-style-type: none"> • Patient is a 27-year-old male presenting with 2nd-degree burns to his hands, arms, and neck. Patient was apparently burning weed with a contraption that uses a propane tank. It started leaking and exploded on him. He burned the dorsal surface of his bilateral hands, his arms, and the left side of his neck. • Patient's images of his burns have sent to the Harborview Burn Service. • PLAN: Transfer patient to Harborview for observation.
----------	---

Name & Date: Austin, Brandon 10-22-18

	This entire report was reviewed. All of the notes in this section were reviewed.
03/18/18	<p>AUSTIN, BRANDON – GENESIS (36 pages)</p> <p>03/18/18: ED discharge instruction reports are reviewed.</p> <ul style="list-style-type: none"> • Patient apparently had a left thumb puncture wound with a nail. All of those notes were reviewed. • This was apparently done at Madigan Hospital. <p>07/05/18: Patient is being seen in the dental clinic.</p> <p>03/18/18: Patient is being seen after having a nail shot through his left thumb with a nail gun. All of the notes from this section are reviewed.</p>
08/26/17	<p>HARBORVIEW MEDICAL CENTER (17 pages)</p> <p>08/26/17: Discharge summary is reviewed.</p> <ul style="list-style-type: none"> • Patient was apparently admitted on 08/25/17 and discharged on 08/26/17. Patient was admitted to the burn floor with acute flame burns to his hands, arms, and neck, which were deemed to be partial thickness, covering 5.5% of his total body surface area. • He was treated with Xeroform and bacitracin to all the burned areas. • He was seen by Physical Therapy. <p>All of those notes were reviewed.</p> <p>08/25/17: Admission note from the Burns/Plastics Team was reviewed.</p> <p>08/25/17: Emergency department note was reviewed.</p>
09/16/09	<p>MADIGAN (34 pages)</p> <p>09/16/09: Patient's demographic information is all reviewed.</p> <p>08/11/17: Outpatient note from Madigan is reviewed.</p> <p>09/07/17: Another note is reviewed.</p> <ul style="list-style-type: none"> • Patient is following up after his burns from an accident. • DIAGNOSIS: Burn of an unspecified region, which is apparently healing. Nonscarring hair loss. <p>All of those notes are reviewed.</p> <p>08/31/17: Another note from Madigan is reviewed.</p> <ul style="list-style-type: none"> • Patient is being seen for burns to his bilateral hands and right upper arm. <p>All of those notes are reviewed.</p>

ADDENDUM 10/25/18: After completing my initial report but before submitting it, I was given over 100 pages of additional records from Harborview Medical Center. These records did not change my opinions as outlined in this report.

Reported Functional Status:

Patient reports that prior to the burn injury in question he was independent with his BADLs and IADLs, worked full-time without difficulty, and was very active outdoors, including hunting and doing various outdoor activities. Since the burn injury in question, patient reports there has been no impact to his BADLs and IADLs, his vocational or avocational status, and basically says it has not physically impaired him at all. The one impact patient reports that he has had is that he now has to wear gloves when hunting, whereas he previously did not need to. He reports that this is because his hands feel colder and are more sensitive.

The patient now has the following physical concerns:

- Patient currently reports that he is essentially pain-free. He does have increased sensitivity along the skin of his arms and states that his hands now feel colder, whereas they previously did not, but otherwise denies any pain. He states that his pain level is at 0/10. He states that there is no physical pain and only the anxiety. He denies any

Name & Date: Austin, Brandon 10-22-18

numbness, tingling, or weakness. He reports no pain at night, able to get 6 hours' sleep.

- Concerning **pain radiation**, there is no radiating pain.
- Concerning **sensory symptoms**, there is no discrete sensory loss.
- Concerning **weakness**, there is no known motor weakness.

Functionally, the patient rates the following:

Sitting, standing, walking, lifting, and lying down all make his pain the best.

Comments about previous treatment:

As discussed above.

Comments about previous diagnostic workup:

As above.

PAST MEDICAL HISTORY

None.

Medications

None.

Allergies

PENICILLIN.

FAMILY HISTORY: Unremarkable per patient.

Unless otherwise noted, Family History is negative for related arthritic disease or neurologic disorder

SOCIAL HISTORY: He is engaged and states that he and his fiancée have an 8-month-old child.

Tobacco: He denies any smoking.

Alcohol: Only occasionally drinks alcohol.

Other: Denies any problems with drugs or alcohol.

VOCATIONAL HISTORY: Patient is still active-duty military.

Current Work Status: He works as a recruiter in Lacey, WA, and is based out of Fort Lewis.

Review of Systems: Patient endorses anxiety, tinnitus, and jaw clicking. With regard to his anxiety, patient describes ongoing nightmares. He reports that for the first 6 months after the burn injury he had nightmares approximately 2-3 times per week and now has them approximately 1-2 times per week. He reports that he is sleeping better, now receiving about 6 hours of sleep, whereas he was only receiving about 4-5 hours' sleep. He does have flashbacks and nightmares about the burning injury in question. He also reports that he is very hypervigilant since this injury. He reports that when he hears children yelling outside he "freaks out." He also reports that if he hears any sound that sounds like the air compression hose he has a very hypervigilant response. Patient reports that he does avoid certain things, including using propane. He reports that prior to the burn injury he bought a nice propane barbeque that he still has not used since the burn injuries in question.

The following body systems were reviewed by the patient:

General Health (e.g. Fatigue, Weight Change)

Psychiatric (e.g. Depression, Anxiety)

Name & Date: Austin, Brandon 10-22-18

Neurological (e.g. Stroke, Seizures, Migraines)

Visual (e.g. Blurred Vision, Double Vision)

ENT/Mouth (e.g. Ringing in Ears, Jaw Clicking)

Heart (e.g. Heart Attack, Irregular Heart Beat)

Resp (e.g. Asthma, Chronic Cough, Shortness of Breath)

GI (e.g. Vomiting, Diarrhea, Ulcer)

GU (e.g. Incontinence, Sexual Dysfunction)

Endocrine (e.g. Diabetes, Thyroid Disease)

Heme/Lymph (e.g. Bleeding Disorder, Cancer)

Allergy/Immun (e.g. Anaphylaxis, Immune Disorder)

Musculoskeletal (e.g. Bursitis, Tendonitis, Pain in Joints)

Unless otherwise noted, ROS were negative for these body systems.

PHYSICAL EXAM (OBJECTIVE)

Patient is alert, cooperative, pleasant with full range of affect, no clear evidence of pain behavior.

I did a thorough examination of his bilateral upper extremities. He has no clear evidence of burn injury along his arms or face. He perhaps has some subtle discoloration of his arms, although I have difficulty appreciating it. His strength is 5/5 bilateral shoulder abductors, biceps, triceps, wrist extensors, wrist flexors, finger extensors, APB, opponens pollicis, interosseous, and finger flexors. There is no evidence of joint contractures at his elbows, wrists, shoulders, or hands. He does not have any clear evidence of allodynia. His pulses are 2+. There is no clear evidence of Raynaud's phenomenon.

ASSESSMENT (On a more probable than not basis related to the burn injury in August 2017, unless otherwise specified.)

1. **Bilateral upper extremity and left facial burn injuries (partial thickness, 5.5% TBSA) without clear residual impairment.**
2. **Post-traumatic stress disorder (PTSD).**
3. **r/o secondary Raynaud's phenomenon.**

DISCUSSION:

Basis for Diagnoses

Overall, this case is very straightforward. With regard to his burn injuries, patient has very clearly had a history of burn injuries, but it is unclear to me that there is any ongoing impairment as a result of these injuries. Although patient notes some discoloration in his skin, I was unable to see any clear, obvious evidence of discoloration. He also describes symptoms that may be consistent with Raynaud phenomenon, but I am not able to validate this concern. Further diagnostic testing can be considered if patient wishes to further evaluate his intermittent hand symptoms that arise in cold weather. Currently this is well managed by simply wearing gloves when he is outside. It is not entirely clear that, even if he has this, it would be related to his burn injury. Trauma can be a risk factor for Raynaud's phenomenon. Other than this concern, he has made an excellent recovery from a physical standpoint.

However, he does have persistent psychological ramifications from his burn injuries. He meets criteria for PTSD. Overall, it is fairly well controlled, and I am not sure that any further treatment is necessarily indicated in this case, as discussed below.

Treatment Rendered

I reviewed all of the treatments as outlined above and find that the treatments to date have been reasonable, medically necessary, and related to the incident in question. I did review the available bills in this case and find that the costs were within the accepted limits of this community.

Name & Date: Austin, Brandon 10-22-18

Further Treatments

As discussed above, it is not clear to me that any further treatment is indicated.

Current Functional Status (Vocational, Avocational & ADLs)

As discussed above, patient reports no current functional issue as a result of the injury in question.

Prognosis

Overall, I believe he has had a good recovery and does not appear to have any residual physical impairment.

Closing Statements

These are my opinions regarding the diagnosis and treatment for this patient. I would be pleased to provide further input regarding diagnosis, treatment options, functional status, and prognosis, including references from the peer-reviewed literature, as requested. I reserve the right to amend my opinions if further relevant data become available after this report is submitted.



Virtaj Singh, MD

Diplomat, American Board of PM&R with subspecialty certification in Pain Medicine
Medical Director, Seattle Spine & Sports Medicine

EXHIBIT 2

Virtaj Singh, M.D.

3213 Eastlake Ave East, Suite A
Seattle, WA 98102

(713) 383-9687
vsingh@seattlespine.com

CURRENT POSITIONS

July 2014-present	Medical Director, Seattle Spine and Sports Medicine
July 2011-July 2014	Attending Physician, Seattle Spine and Sports Medicine
Aug. 2011-present	Clinical Assistant Professor University of Washington School of Medicine Department of Physical Medicine and Rehabilitation
Nov. 2015-present	Clinical Assistant Professor A.T. Still University School of Osteopathic Medicine Physical Medicine and Rehabilitation

POSTGRADUATE TRAINING & BOARD CERTIFICATIONS

July 2010-June 2011	Pain Medicine Fellowship University of Washington School of Medicine Department of Anesthesiology and Pain Medicine Pain Medicine Subspecialty Board Certified (2012)
June 2006-June 2010	Physical Medicine and Rehabilitation Residency University of Washington School of Medicine Physical Medicine and Rehabilitation Board Certified (2011)

EDUCATION

Aug. 2002-May 2006	Baylor College of Medicine, M.D.
Aug. 1998-May 2002	University of South Alabama, B.S. Biomedical Sciences Major, Chemistry Minor Summa Cum Laude

HONORS

University of Washington

2010-2011	Chief Fellow, Pain Medicine Department of Anesthesiology and Pain Medicine
2011	Best in Category Poster - Department of Anesthesiology and Pain Medicine Academic Evening
2009-2010	Chief Resident Department of Physical Medicine and Rehabilitation

Baylor College of Medicine

2006	Lewis A. Leavitt, M.D. Memorial Award for Excellence in PM&R
2002-2006	Full tuition scholarship to Baylor College of Medicine Hobby Foundation Presidential Excellence Award (2006) Bob Bullock Presidential Excellence Award (2002-2005)

University of South Alabama

2002	Writing Competition Award
2002	Dean's Award for Academic Excellence in Biomedical Sciences
2002	BMD Award (Highest graduating G.P.A, Department of Biomedical Sciences)
2001-2002	Intramural Leadership Award
2000-2002	Dean's Honor List, Department of Biomedical Sciences
1999-2000	Outstanding Physics Student Award
1998-2002	President's List
1998-2002	Presidential Scholarship

PUBLICATIONS/PRESENTATIONS

Singh V, Friedrich J. Radiofrequency Neurotomy for Chronic Spinal Pain. *Comprehensive Pain Management in the Rehabilitation Patient, A Reference Guide*. (In preparation.)

Stogicza A, **Singh V**, Trescot A. Neurogenic Thoracic Outlet Syndrome. Invited chapter in: *Pain Management Review: A Problem-Based Learning Approach*. (In preparation.)

Robinson J, **Singh V**. Guest Editors. *Physical Medicine and Rehabilitation Clinics of North America: Chronic Pain*. Volume 26, Issue 2, May 2015.

Seroussi R, **Singh V**, Fry A. Post-Whiplash Pain. *Physical Medicine and Rehabilitation Clinics of North America: Chronic Pain*. Volume 26, Issue 2, May 2015: 359-373.

Singh V, Trescot A, Nishio I. Injections for Chronic Pain. *Physical Medicine and Rehabilitation Clinics of North America: Chronic Pain*. Volume 26, Issue 2, May 2015: 249-261.

Singh V. Upper Extremity Section Editor. *Peripheral Nerve Entrapments: Clinical Diagnosis and Management*. (In press.)

Singh V, Burnett C, Seroussi R. Thoracic Outlet Syndrome. Invited chapter in: *Peripheral Nerve Entrapments: Clinical Diagnosis and Management*. (In press.)

Singh V, Trescot A. Ulnar Nerve Entrapments. Invited chapter in: *Peripheral Nerve Entrapments: Clinical Diagnosis and Management*. (In press.)

Singh V, Ericson W. Median Nerve Entrapments. Invited chapter in: *Peripheral Nerve Entrapments: Clinical Diagnosis and Management*. (In press.)

Seroussi R, **Singh V**. Radial Nerve Entrapment: Radial Tunnel Syndrome. Invited chapter in: *Peripheral Nerve Entrapments: Clinical Diagnosis and Management*. (In press.)

Kennedy DJ, Levin J, Rosenquist R, **Singh V**, Smith C, Stojanovic M, Vorobeychik Y. Epidural Steroid Injections are Safe and Effective: Multisociety Letter in Support of the Safety and Effectiveness of Epidural Steroid Injections. *Pain Medicine* 2015; 16: 833-38.

Bristow SJ, **Singh V**, Ballantyne JC. Opioids. Invited chapter in: *Encyclopedia of Neurological Sciences* 2E. 2014, 653-657.

Singh V, Joseph PJ, Hakimi K. Electrical Nerve Stimulation as a Diagnostic Tool. Manchikanti L, ed. *Pain Medicine and Interventional Pain Management: A Comprehensive Review*. Volume I: Foundations, 2011; 359-367.

Singh V, Bowerman K, Soulakvelidze I, Taylor TR. Botox for Headaches: A Comprehensive Literature Review. Poster presented at: Department of Anesthesiology and Pain Medicine Academic Evening; May, 2011.

Singh V, Green JR, Krabak BJ. Chronic knee synovitis in an adolescent dancer. *PM&R*. 2010; 2(6):573-575.

Singh V, Krabak BJ. Posterior knee pain in a dancer. *Medicine and Science in Sports and Exercise*. Poster presented at: American College of Sports Medicine Annual Meeting; May 2009; Seattle, WA.

Garvin KW, **Singh V**. Case Report: Cutaneous myiasis caused by *Dermatobia hominis*, the human botfly. *Travel Med Infect Dis*. 2007; 5(3):199-201.

PROFESSIONAL EXPERIENCE

Sporting Event Medical Staff

2009-present	Seattle Rock 'n' Roll Marathon (Medical Team Captain)
2008-2010	Roosevelt High School Football Team
2009	Seattle Breast Cancer Walk
2007-2009	Seattle Marathon (Finish Line Tent)
2005-2006	Houston Marathon (Mile 23 & 24 Tents)

Athletic Pre-Participation Physical Exams

Oct. 2009	University of Washington Crew Team
June 2009	Mount Si High School
May 2003	Houston Sports Physical Day

MDSI Physicians Group

Nov. 2008-June 2010 Performed disability evaluations for Social Security Administration

INVITED LECTURES

The Interventional Physiatry Approach to Lumbosacral Trauma

-Lecture presented at "MVC Trauma: Advanced Med-Legal Seminar for Today's Integrated Healthcare Provider" (May 2016)

Spine Injections

- Lecture presented at University of Washington School of Medicine: "33rd Annual Review Course in Physical Medicine and Rehabilitation" (March 2016)
-Lecture presented at University of Washington School of Medicine: "32nd Annual Review Course in Physical Medicine and Rehabilitation" (March 2015)

Medical Management of Concussions

-Lecture presented at "Concussion Education: Knowledge That Counts" (IRG Greenwood, March 2016)

Acute Whiplash Management: More Questions Than Answers

- Lecture presented at OrthoEd Symposium: "Integrating the Management of Whiplash Associated Disorders" (April 2015)

Chronic Whiplash Management: Still More Questions Than Answers

- Lecture presented at OrthoEd Symposium: "Integrating the Management of Whiplash Associated Disorders" (April 2015)

Thoracic Outlet Syndrome: Concepts and Controversies.

-Lecture presented at Washington State Association for Justice Continuing Legal Education seminar: "The Legal Team" (February 2015)

Cervicogenic Headaches: An Interventional Approach.

- Lecture presented at OrthoEd Symposium: "Integrating the Management of Whiplash Associated Disorders" (April 2015)
- Lecture presented at Swedish Neuroscience Institute's bimonthly continuing medical education Spine Conference. (September 2013)
- Lecture presented at continuing education seminar for Physical Therapists: "Vertigo, Cervicogenic Dizziness, and Cervicogenic Headaches: Evaluation, Differential Diagnosis and Management" (March 2013)

Interventional Spine Procedures: Simplified.

- Lecture presented at continuing education seminar for Doctors of Chiropractic Medicine: "Dan Dock" lecture series: Auto Collision Related Spine Injuries 2012 (February 2012)
- Lecture presented at Washington State Association for Justice Continuing Legal Education seminar: "Medicine for Lawyers: Connective Tissue Injuries" (October 2011)

Prolotherapy and Platelet Rich Plasma: Effective Medicine or Snake Oil?

- Lecture presented at Seattle Spine and Sports Medicine Bimonthly Conference (September 2011)

TEACHING RESPONSIBILITIES*University of Washington Departments of Physical Medicine & Rehabilitation and Pain Medicine*

July 2014-present	Attending Physician Supervising Pain Medicine Fellows
July 2012-present	Clinical Clerkship Mentor to Medical Students
Aug. 2011-present	Attending Physician Supervising 3 rd and 4 th Year Residents
Aug. 2011-present	Faculty Advisor to Residents
January 2012	<i>Interventional Spine Procedures: Simplified</i> , resident lecture
May 2011	<i>Musculoskeletal Examination Skills</i> , resident lecture
Oct. 2009-June 2010	Co-Director, Grand Rounds
Oct. 2009-June 2010	Co-Director, Musculoskeletal and Sports Medicine Conference
July –Aug. 2009	Co-Director, PM&R 101, Residency Orientation Lecture Series
June 2009	Co-Director, Electrodiagnostic Medicine Workshop

MEMBERSHIPS

2012-present	Washington State Medical Association
2010-present	International Spine Intervention Society
2010-present	Puget Sound Spine Society
2010-present	American Academy of Pain Medicine
2008-present	American Academy of Physical Medicine and Rehabilitation
2011-2014	American Association of Pain Management in Ultrasound
2009-2014	American College of Sports Medicine
2012-2013	American Pain Society
2010-2011	American Society of Interventional Pain Physicians
2002-2011	American Medical Association
2002-2006	Texas Medical Association
1998-2002	Biomedical Society, University of South Alabama
1998-2002	Alpha Epsilon Delta Honors Society, University of South Alabama

SERVICE

2014-present	Self Assessment Examination (SAE) Committee, American Academy of Physical Medicine and Rehabilitation
2014-present	Health Policy Committee, International Spine Intervention Society
2014-present	University of Washington PM&R Clinical Competency Committee (CCC)
2012-present	Director, Seattle Spine and Sports Medicine Conference Series
2009-present	University of Washington PM&R Committee for Residency Evaluation

2009-2010	University of Washington Rehabilitation Medicine Steering Committee
2009-2010	Lehman Day Committee, University of Washington
2005-2006	Founder/President, Baylor PM&R Student Interest Group
2005	Saturday Science Program, Baylor College of Medicine
2001-2002	Athletics Director, Biomedical Society
2001-2002	Athletics Director, Alpha Epsilon Delta Honor Society
1998-2002	Student Advisory Committee, University of South Alabama

INTERESTS

2014-present	Recreation Adult Team Soccer (Division Champions, 2015)
2008-2013	Underdog Sports Kickball League (Division Champions, 2009, 2010, 2011; Team Captain 2011-2013)
2007-2013	Underdog Sports Football League
2007-2009	AE Volleyball League (Division Champions, 2009)
2007-2008	Puget Sound Basketball League
2003-2004	Baylor Co-Recreational Football Team (Team Captain, 2003-2004)

EXHIBIT 3

**List of Expert Testimony
Virtaj Singh, M.D.**

CASE	COURT/CASE NUMBER	RETAINING PARTY	DATE
2018			
Robert Segal v. The Quadrant Corporation	17-2-10472-8 SEA	Plaintiff: Matthew Quick	11/15/2018
Jonathan Davis vs. USAA Casualty and State Farm Insurance	2:17-cv-01232- TSZ	Plaintiff: Charles Randall	11/08/2018
Gordon Marks v. Nikolin	17-2-28815-2 SEA	Plaintiff: Sam Elder	11/06/2018
Beverly Ferrell v. The Boeing Company	17-2-19758-1 KNT	Plaintiff: Friedman Rubin	09/27/2018
Kristin LaCroix v. Healy		Plaintiff: Scott Shawver @ GLP	09/25/2018
Tanya Roussy v. Thayer Excavating, LLC	17-2-05317-1 SEA	Plaintiff: Greg Samuels	08/24/2018
Lea Black v. Pride Mobility Products Corp, et al.		Plaintiff: Sims Weymuller	07/19/2018
Sheri McGill		Plaintiff: Joe Schwab	07/16/2018
Wilson v. Dennis		Plaintiff: Mike Myers	07/11/2018
Burns v. CEVA Freight Canada Corp	16-2-15366-31	Plaintiff: Joel Nichols	06/21/2018
Cross vs. American Service Insurance	17-2-27128-4 KNT	Plaintiff: Ken Friedman	06/21/2018
Danielsen vs. Sundberg	14-2-05586-1	Plaintiff: Jason Baker	06/01/2018
Moradi-Lakeh, MD vs. Group Health Cooperative	17-2-03192-5 SEA	Plaintiff: Mallory Allen	05/30/2018
Luis Garcia Torres	17 21196	John Wallace	05/16/2018
Cook vs. Country Financial Insurance		Plaintiff: Paul Lindenmuth	04/27/2018
Colin P. Rogerson	17-16155		04/05/2018
Moradi-Lakeh, MD vs. Group Health Cooperative	17-2-03192-5 SEA	Plaintiff: Mallory Allen	04/04/2018
Marvin Aronson – Board of Industrial Insurance Appeals	17-17225	Plaintiff: John Detori	02/16/2018
Osenbrock v. Pineda-Cordeiro	KCSC 16-2-20630-1	Plaintiff: Scott Donaldson &	02/09/2018

		Francisco Duarte	
Brooks v. USA	USDC Western District of WA C17-00154 JCC	Plaintiff: Mike Myers	02/07/2018
Michael Eacrett		Plaintiff: Mike Myers	02/01/2018
Hart v. Prather, et al.	PCSC 12-2-14762-6	Plaintiff: Paul Lindenmuth	01/17/2018
2017			
Asbury	16-2-00053-2	Plaintiff: Judy Massong	11/20/17
Linguist v. State Farm	USDC of WA 2:17-cv-00054	Plaintiff: Erika Holsman	10/06/17
Bigleman v. State Farm	KCSC 16-2-13566-8	Plaintiff: Pat Trudell	09/14/17
Vadney - Board of Industrial Insurance Appeals		Plaintiff: Jane Dale	09/13/17
Williams v. Cuban	PCSC 16-2-10281-1	Plaintiff: Kevin Hastings	08/10/17
Moura v. White	16-2-10281-1	Plaintiff: Tom Jacobs	07/26/17
Kuncl v. USA, et al.	USDC Western District of WA 2:16-cv-00337	Defense:Pat Gugin	06/21/17
Orn v. City of Tacoma	USDC Western District of WA 3:13-cv-05974	Plaintiff: Loren Cochran	06/15/17
Batz v. Jarrett		Plaintiff: Cole Douglas	05/23/17
Patino v. State Farm	USDC Eastern District of WA 16-5096	Plaintiff: Peter Hess	05/22/17
Oroville Young		Plaintiff: Michael Charbonneau	04/28/17
Kevin Beach - Board of Industrial Insurance Appeals	16 18800 & 16 18991	Plaintiff	04/13/17
Rookstool v. Eaton and Quincy School District No. 144	13-2-01463-1	Plaintiff: Kristine Grelish	04/12/17
Olesky v .Greaves	13-2-02407-8	Plaintiff: Mark Belanger	02/17/17
Board of Industrial Insurance Appeals	16 16773	Plaintiff	01/27/17
Ketilsson v. Bonzer	15-2-14684-5	Plaintiff: Scott Blair	01/11/17
Milless v. State Farm Mutual Automobile	USDC Western	Plaintiff: Joseph	01/03/17

Insurance	District of WA 2:16-cv-00743	Moore	
2016			
Cowley v. Atkins, Seattle School District		Plaintiff: Gary Gosanko	12/23/16
Jena M. Owen - Board of Industrial Insurance Appeals	16-14027	Plaintiff: Robert Silber	12/13/16
Mike C. Cavin, Sr. - Board of Industrial Insurance Appeals	15-20429	Plaintiff	11/17/16
Wilson v. Laurier Enterprises d/b/a McDonald's Restaurant, Inc.	14-2-002311 Kitsap Co	Plaintiff: Kevin Hastings	11/03/16
Concepcion Solis Perez - Board of Industrial Insurance Appeals	15-24167	Plaintiff	10/31/16
McBride v. Cox; Wesche		Plaintiff: Kyle Olive	10/19/16
Wachter v. Fred Meyer Stores, Inc.		Plaintiff: Ron Unger	09/26/16
Longoni v. Allstate Insurance		Plaintiff: John MacDonald	08/31/16
Knight v. Steward		Plaintiff: Scott Blair	08/23/16
Harstad v. South Sound Remodelers, LLC		Plaintiff: David Roosa	06/21/16
Mavis Tugby v. Christopher Reilly	KCSC 14-2-14975-1	Plaintiff: Kevin Hastings	06/14/16
Keenan, Andrea v. Cave B., LLC		Plaintiff: Fred Langer	05/03/16
Thorpe Shwer; Winckler, Joseph		Plaintiff	03/25/16
State of Washington v. Richard Turay and Suzanne Wininger	KCSC 02-2-07990-3	Plaintiff: Michael Mohandeson	03/14/16
Murray, Dunham & Murray; Rose, Philip		Plaintiff	02/22/16
Barcus, Ben; Hart, Rebekah		Plaintiff	02/21/16
Crockett v. Biere, et al.		Plaintiff: Wes Edmunds	01/04/16
2015			
Bechtel v. Bergin	14-2-00410-0	Plaintiff: Monte Willis	11/24/15
Telford v. Burger, et al.	KCSC 14-2-06078-5	Plaintiff: Niomi Drake	11/09/15
Sangha v. Buchanan	Whatcom County Superior Court 13-2-01600-8	Plaintiff: Michael Charbonneau	11/02/15
Reck, Tara; Naidu, Vijay		Plaintiff	09/29/15
Calborn & Schwab, PSC; Barela, Fabian		Plaintiff	09/09/15

Board of Industrial Insurance Appeals	15-10905	Plaintiff	09/03/15
David Norton v. Western Industries/Chartis		Plaintiff: Amie Peters	08/18/15
Gaspich Law Office, PLLC; Gray, Calvin		Plaintiff	08/18/15
The Walthew Law Firm; Roberts, Doric		Plaintiff	07/30/15
Holmes Weddle & Barcott; Doucoure, Abdourahmane		Plaintiff	07/27/15
Carey et al. v. Crockett, et al.	KCSC 14-2-18625-8	Plaintiff: Sam Elder	12/11/15
Hicks v. U.S.A.	DJJ 15-W- USA86-0003	Defense: Anette Hayes	12/04/15
Smith v. Avilla	14-2-07118-1	Plaintiff	06/30/15
Board of Industrial Insurance Appeals	14-21841 14-24542	Plaintiff	06/25/15
Hicks, et al. v. U.S.A.		Defense	06/16/15
Board of Industrial Insurance Appeals	14-10935	Plaintiff	06/15/15
Moniz v. Mazza, et al.	KCSC 12-2-04063-0	Plaintiff: Daniel Clare	04/21/15
Erickson v. Shull; Fujita		Plaintiff: Ressler & Tesh	04/21/15
Board of Industrial Insurance Appeals	14-25751 14-25752 14-25658 14-25659	Plaintiff	03/19/15
Ali v. American Seafoods Co., et al.	KCSC 14-2-34510-1	Plaintiff: George Luhrs	03/12/15
2014			
Bevington v. Ma		Plaintiff: Sims Weymuller	12/09/14
Savage v. Pabiniak		Plaintiff: Jeffrey Tilden	10/01/14
Board of Industrial Insurance Appeals	14-10398	Plaintiff	09/23/14
Gabbert v. Costco Wholesale Corporation		Plaintiff: Heather Webb	09/22/14
Beck v. Farmers Insurance		Plaintiff: Teri Rideout	07/10/14
Derrick v. Progressive Casualty Insurance Co.	USDC 3:13-cv-06038	Plaintiff: Nathan Needham	06/23/14
Dunbar v. Brunner	13-2-06121-8	Plaintiff: Dominic Bacetich	06/04/14
Mudgett v. Corporation of the Presiding Bishop of the Church	C 13-05537 BHS	Plaintiff: Shawn Briggs	05/19/14
Carpenter v. U.S.A.		Defense: Priscilla Chan	05/17/14

Rafiq v. Diagne		Plaintiff: Wes Edmunds	04/08/14
Gloria v. Pruzan, et al.	KCSC 12-2-16063-5	Plaintiff: Scott Blair	01/06/14

EXHIBIT 4

SEATTLE SPINE & SPORTS MEDICINE

3213 Eastlake Ave East, Suite A Seattle, WA 98102

206-861-8200 (W) 206-324-1178 (F)

On-line at SeattleSpine.com EIN: 91-2149833**FORENSIC SERVICES RATE SCHEDULE***

**FULL PAYMENT REQUIRED FOR ANY SCHEDULED TIME WITHIN 48 HOURS OF SCHEDULING OR
WE RESERVE THE RIGHT TO CANCEL THIS SCHEDULED TIME.**

SERVICES	HOURLY RATE	PAYMENT POLICY	COMMENTS
Non-Testimony Time Includes chart reviews and clinical evaluations.	\$450	\$900 Retainer <ul style="list-style-type: none"> Pays for first 2 hours of case review. \$900 retainer is non-refundable. 	<ul style="list-style-type: none"> For patient exams, cancellation policy is as noted below. We reserve the right to ask for up to a \$5000 retainer in advance, on a case-by-case basis.
Deposition & Arbitration Testimony Time	\$450	<ul style="list-style-type: none"> Advance payment equal to SCHEDULED testimony time is required. Refunds are subject to cancellation policy. 	Minimum testimony time: <ul style="list-style-type: none"> 1 ½ hours for depositions or arbitrations (\$675 advance payment). Portal-to-portal travel time is charged. Video depositions at our office are \$225 extra, due to procedure room loss.
Live Trial Testimony Time	\$450	<ul style="list-style-type: none"> Advance payment equal to SCHEDULED testimony time is required. Refunds are subject to cancellation policy. 	Minimum testimony time: <ul style="list-style-type: none"> 5 hours minimum for judge or jury trials (\$2250 advance payment). Portal-to-portal travel time is charged.

- Virtaj Singh does not agree to be listed as an expert or consultant unless retainer has been received.** Expert services and testimony are not confirmed until retainer has been received.
- We expect full prompt payment for reports prior to releasing our work.**
- 1.5% monthly finance charges apply for all services not paid in full within 30 days after date of invoice.
- If Virtaj Singh is requested to give testimony with less than 5 business days notice, he reserves the right to increase his hourly testimony fee to \$600/hr, given disruption in patient care.**

CANCELLATION POLICY FOR SCHEDULED TIME

Less than 72 hours:	Not Refundable
Within 10 business days:	50% Refundable
More than 10 business days:	100% Refundable

EFFICIENT RECORD REVIEW GUIDELINES

AS OF 2013, WE PREFER DIGITAL RECORDS AND WILL CHARGE UP TO \$150 FEE FOR THE ADMINISTRATIVE BURDEN OF PAPER RECORDS.

INDEXING:	Records should be separated by provider with separate PDF file for each provider (or separate tabbed section for paper records)
CHRONOLOGY:	Within each section (representing a single provider), records ideally should be sorted from earliest date of service at the front of the section , progressing to later dates in chronological order.

**PLEASE
NOTE**

* Fee schedule as of 01/06/2014. Prices may change without notice.

EXHIBIT 6



Welding & Joining Management Group

FORENSIC EXPERTS • METALS TESTING

January 14, 2019

Mr. Cole Douglas, Attorney
Pfau Cochran Vertetis Amala PLLC
911 Pacific Avenue, Suite 200
Tacoma WA 98402

Re: Case Number 3:17-cv-06028-BHS, Brandon Austin (Plaintiff) v. Harbor Freight Tools, USA, Inc. (Defendant).

Preliminary Assessments of Subject Torch and Hose of Weed-Burner Assembly. Examinations at ESI labs in Seattle WA, on June 3rd and October 18, 2018.

Dear Mr. Douglas,

On March 13, 2018, I was hired by PCVA law firm to review the subject case; assess exemplar torch and hose assemblies for propane leaks; and participate in assessments for propane leaks from the subject weed-burner torch and hose assembly at ESI.

PRODUCT IDENTIFICATION EXAM

On June 3rd, initial protocol assessments were conducted at ESI with the defendant lawyer and expert to confirm the identification and features of the subject weed-burner and hose assembly. It was confirmed that the subject weed-burner and hose assembly at ESI was the referenced assembly purchased by Brandon Austin (Plaintiff) in this case. The torch body and tubes were marked and regions designated for further x-ray examinations by ESI.

INITIAL INVESTIGATION

Prior to the destructive assessments at ESI on October 18th, I purchased 10 weed-burner torch and hose assemblies from Harbor Freight of the same part number: Greenwood Item 91033. Figure 1. and Figure 2.



Figure 1. Torch Assemblies in Laboratory, Greenwood Item 91033



Figure 2. Torch Assemblies in Laboratory, Greenwood Item 91033

In my laboratory, the exemplar torches were assessed for leaks using propane gas from a 15# cylinder. Five of the exemplar torches leaked near the handle when leak tested at torch body regions adjacent to the handle and inlet tube threads. On a more probable than not basis and based on a reasonable degree of scientific certainty, the fundamental cause of the

3756 Monarch Street • Frederick, Colorado 80516 • www.WJMG.com

OFFICE: 303-451-6759 • FAX: 303-280-4747 • TOLL-FREE: 800-987-9269



Welding & Joining Management Group

FORENSIC EXPERTS • METALS TESTING

observed leaks was deficient thread engagement length of inlet tube threads inserted and screwed into torch body. Approximately 6 threads were available on the tubes and in the torch body.

An exemplar weed-burner torch and hose assembly with a propane cylinder are shown in Figure 3. Leaks in the torch inlet tube regions of the exemplar weed-burner are in Figure 4.



Figure 3. Exemplar Weed-burner Torch & Propane Cylinder.



Figure 4. Leaks in Torch of Exemplar Weed-burner.

In the laboratory, the exemplar torches that leaked had inconsistent inlet tube thread engagement with the torch body threads as well as variations in dimensions of the crown, root and thread angles. These variations indicated that on a more probable than not basis and based on a reasonable degree of scientific certainty thread-forming practices for the mating threads by the original manufacturer varied greatly.



Figure 5. Cross-Section - Exemplar Torch Inlet Connection, 3 Inlet Threads Engaged.

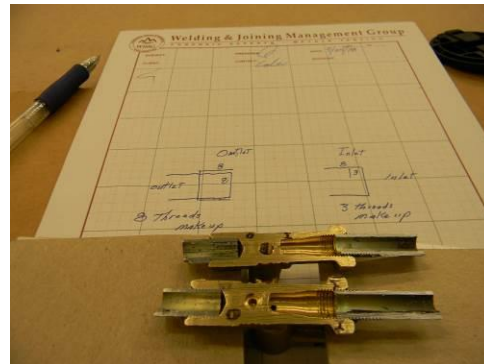


Figure 6. Cross-Section - Exemplar Torch Inlet Connection - 3 Inlet Threads Engaged, 8 threads available.

DESTRUCTIVE TESTING

Examinations of the subject torch and hose assembly were conducted at ESI labs in Seattle, WA, on October 18th. The subject torch and hose assembly were stored at ESI after the initial product ID examinations on June 3rd. The protocol at ESI on October 18th adhered to many of the agreed-upon methods from the protocol dated September 7th. The following attendees participated in the ESI examinations:

- Robert Spajic, Attorney – Gordon & Polser, Attorneys LLC – Portland OR, for Defendant.
- John Schumacher, Vice President & Principal Engineer – AEI Corp., Littleton CO, for Defendant.
- Shawn Sapp, Senior Scientist – AEI Corp., Littleton CO, for the Defendant.
- Cole Douglas, Attorney – PCVA, Tacoma WA, for the Plaintiff.

3756 Monarch Street • Frederick, Colorado 80516 • www.WJMG.com

OFFICE: 303-451-6759 • FAX: 303-280-4747 • TOLL-FREE: 800-987-9269



Welding & Joining Management Group

FORENSIC EXPERTS • METALS TESTING

- Jesse Grantham, Principal – Welding & Joining Management Group – Frederick CO, for Plaintiff.
- Keith Cline, Senior Consultant Engineer – ESI, Seattle WA
- Paul Josten, Senior Lab Technician – ESI, Seattle WA



Figure 7. Subject Torch and Hose Assembly - Stored at the ESI facility.

Description of events on October 18th at ESI:

The subject torch and hose were removed from the storage container, visually examined and the condition documented. The melted blue plastic handle overall length and configuration were documented. The melted blue handle, inlet tube hose connection fitting, inlet tube male threads at the torch body, outlet tube fitting to the burner and outlet tube threads at the torch body were documented. The inlet tube hose connection nut to the torch body fitting was not snug-tight. The loose nut was not observed or tested during preliminary protocol examinations on June 3rd. Figures 8 - 9.

During the protocol examinations, the lever handle and the plastic knob regulator on the subject torch were not removed from the torch body. Exemplar torch and hose assemblies were available for visual comparisons of the damaged subject torch and fractured subject hose assembly.

The subject propane gas supply hose, which was manufactured in China, was fractured with a gaping opening at the ferrule nut-to-torch inlet tube fitting and could not be used during the examinations. The exemplar propane gas supply hose, manufactured in Italy, coming from a Greenwood Item # 91033 kit, was used to test features of the subject torch body and threads.

An air regulator, pressure gauges, flow-meters and fittings were provided for use during the protocol. The compressed air did not simulate the low temperature (thermal) effects of propane gas flow through the weed-burner torch. The available source of compressed air media for these tests at ESI was compressed air, not propane gas. The exemplar plastic handle features, torch body, hose, knob, level handle and visible regions of the threads were visually compared with similar items of the subject torch, fittings and hose assembly. Figures 10-11.

During the October 18th protocol, it was noted that the supply hose "brass nut" was slightly loose, less than finger-tight, at the inlet tube fitting. The brass nut was not loose during initial examinations on June 6th. The Plaintiff testified in his interrogatory responses that he tightened the nut as specified by the manufacturer before using the torch. X-rays conducted by an ESI contractor on June 6, 2018, indicated that the brass nut was fully engaged and the inlet threads were fully inserted into the torch body.

3756 Monarch Street • Frederick, Colorado 80516 • www.WJMG.com

OFFICE: 303-451-6759 • FAX: 303-280-4747 • TOLL-FREE: 800-987-9269



Welding & Joining Management Group

FORENSIC EXPERTS • METALS TESTING

According to Plaintiff's Interrogatory responses, the plaintiff used the propane torch continuously for 20 minutes. On a more probable than not basis and based on a reasonable degree of scientific certainty when the connection brass nut was exposed to the heat of the fire, the brass nut loosened as a result of the coefficient of thermal expansion of brass. (Refs 2) On a more probable than not basis and based on a reasonable degree of scientific certainty the brass nut diameter was subjected to expansion during the elevated temperatures of the fire at a rate of 11×10^{-6} inches per degree Fahrenheit. (Refs 2) On a more probable than not basis and based on a reasonable degree of scientific certainty the temperature of the propane fire was equal to or greater than 1000°F (Ref 3) and the brass nut would be expected to expand approximately 0.011". (Refs 2) On a more probable than not basis and based on a reasonable degree of scientific certainty the brass nut became loose as a result of thermal expansion effects during the weed-burner torch fire. On a more probable than not basis and based on a reasonable degree of scientific certainty moving the torch post-accident also was a contributing factor to the loose nut. (Refs 2, 3)



Figure 8. Subject Inlet Nut.



Figure 9. Subject Inlet Nut.



Figure 10. Exemplar Assembly & Subject Assembly.



Figure 11. Exemplar & Subject Inlet Hose Connections.

Selected regions of the subject torch and damaged hose were assessed with the aid of a stereo microscope at magnification of 5X–20X. The magnified observations for damage to the brass nut and metal threads were inconclusive.

The following items were observed and documented:

- Subject blue plastic handle (melted) features, overall length, and inlet fitting tube-to-body.
- Inlet tube male thread lengths at the torch body were tapered, 18 threads/inch.
- Inlet fitting-to-tube female threads lengths were tapered, 18 threads/inch.
- Outlet tube male thread lengths at the torch body were tapered, 18 threads/inch.
- Outlet fitting-to-tube female thread lengths were tapered, 18 threads/inch.



Welding & Joining Management Group

FORENSIC EXPERTS • METALS TESTING

The exemplar plastic blue handle, fully intact and not melted, was documented. The dimensions noted were the overall length, inlet fitting tube-to-torch brass body, inlet tube male thread length, outlet fitting tube-to-body, outlet tube male thread length. The inlet tube threads and torch body threads were tapered threads, approximately 18 threads/inch.

The design of the blue plastic handle was visibly deficient as evidenced by an interference fit of the inlet tube fitting & the blue plastic handle. The handle was too long and interfered with tightening the inlet tube into the torch body. The inlet tube thread engagement with the torch body prevented full engagement and tightening the brass nut to the fitting of inlet tube. The inlet tube length was 5.55" overall length and a flat washer 0.055" thick versus the overall blue plastic handle length of 4.88". The resultant interference of these dimensions allowed inlet tube thread engagement of 0.09375" versus available thread engagement length of 0.1875" in the torch body. The lack of thread engagement length directly contributed to propane gas leaks emanating from the inlet tube partially threaded region.

There were deviations in the agreed-upon Torch Examination Protocol of September 7, 2018, (Refs 4) during the events at the ESI laboratory and air was used for the flow tests on October 18th. The leak tests of the subject assembly, hose and components were not conducted with propane gas. (Refs 4)

The subject blue plastic handle was melted and measurements for an interference fit were rendered inconclusive.

Compressed air was substituted for propane gas during the examinations at ESI. Air-tight connections were observed in the subject torch at ambient temperatures, when the exemplar hose was connected to check for air leaks. The air did not provide information or data about the possibility of cryogenic thermal effects. The compressed air was regulated to 50 psi and 100 psi and was connected through a flowmeter with an adjustable air flow-rate 25-60 cubic feet per hour (cfh). Connections are displayed in Figures 12 - 13.



Figure 12. Air Regulator and Apparatus.

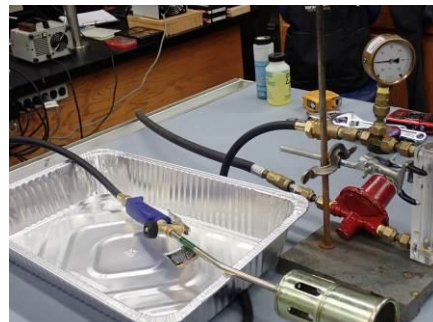


Figure 13. Exemplar Set-up - Check for Air Leaks.

Compressed air from the exemplar torch leaked as indicated by the large bubbles in the soapy, leak detection solution that appeared at the ends of the blue plastic handle (inlet and outlet) of the exemplar torch assembly. Figures 14 - 15.



Welding & Joining Management Group

FORENSIC EXPERTS • METALS TESTING



Figure 14. Exemplar Leaks at Blue Plastic Handle, Compressed Air 50 psi.



Figure 15. Exemplar Leaks at Blue Plastic Handle, Compressed Air 100 psi.

During the protocol at ESI, unsuccessful attempts were made to flow compressed air through the damaged hose connection of the subject torch inlet. The fractured region in the subject hose, near the crimped inlet connection fitting of the torch, had a large opening that leaked. Figure 16 – 17.

Compressed air did not flow into the subject torch body through the damaged subject hose due to the large fractured region of the subject hose assembly. For the purposes of the protocol, the exemplar hose (Italian-made) was connected to the subject torch body to allow compressed air into the subject torch body to check for leaks. There were no leaks observed in the subject torch body. There was no evidence of air leaks at the melted handle region of the subject torch body.

The Subject torch assembly was subjected to compressed air flow in a similar manner to the Exemplar torch assembly. The flowrate and pressure were the same as applied to the Exemplar torch assembly. Leak detection solution was applied to the inlet threads and outlet threads at the blue plastic handle of the Subject torch assembly.

The Subject torch and body did not have leaks at the ends of the blue handle. These tests and assessments were considered inconclusive for propane gas usage. Figures 16 - 17.



Figure 16. Subject Handle Inlet, No air leaks.



Figure 17. Subject Handle Outlet, No air leaks.

A small, electric cutting tool and a cutting disk were used to remove the blue plastic handles of both the Subject and Exemplar torches. The handles were separated and removed from the torch bodies to expose the inlet and outlet tube threads. The Exemplar blue plastic handle was assessed and documented. On the Subject torch the inlet tube thread engagement was observed on the inlet tube threads with the torch body. Visual inspections were conducted for air leaks and the integrity of the brass body. All threaded tube connections in the torch body were visually assessed. Figures 18 – 21.



Welding & Joining Management Group

FORENSIC EXPERTS • METALS TESTING



Figure 18. Subject Plastic Handle Sectioned, Inlet Tube.



Figure 19. Subject Torch Body and Inlet Tube Threads.



Figure 20. Engagement of the Subject Inlet Tube Threads.



Figure 21. Subject Torch Body, Inlet Tube, Tube Threads & Melted Blue Handle.

On the Subject torch and Exemplar torch, the engagement lengths of the inlet tube male threads were examined in incremental stages during dis-assembly. During the protocol the Exemplar torch body and Subject torch body internal female threads and tube male threads were examined and found to be fully engaged. As each tube was unscrewed from the torch body, the threads were carefully examined and counted. The available threads-per-inch, type of thread crests, roots and amount of actual thread engagement in the torch body and engagement to brass fittings were noted and documented.

The fitting onto the Subject torch inlet tube was tightly engaged with all 6 threads into the brass body 6 threads engaged in both cases. The X-ray films indicated engagement of the inlet tube threads into the torch body and did not reveal the lack of engagement of the threads or thread dimensions.

The Exemplar and Subject hoses were sectioned radially, approximately one inch from the end of the crimped fitting, on the torch inlet side. Figures 22 - 23.



Welding & Joining Management Group

FORENSIC EXPERTS • METALS TESTING



Figure 22. Subject Inlet Nut, Crimp Fitting, Hose.



Figure 23. Subject Inlet Hose at Failed Opening.

The sectioned crimp/ferrule connections were visually inspected and documented. The disassembled components were assessed with optical microscopy. Photo images were shared from the microscopy images. It was agreed that chemical analysis and surface measurements of the ferrule connections were unnecessary at this time, though reserved for future examinations.

The hose and crimped ferrule of the subject inlet tube fitting were cut longitudinally and opened. The crimp/ferrule connection was disassembled and documented. The outlet side of the hose connection was opened. Figures 24 - 25.

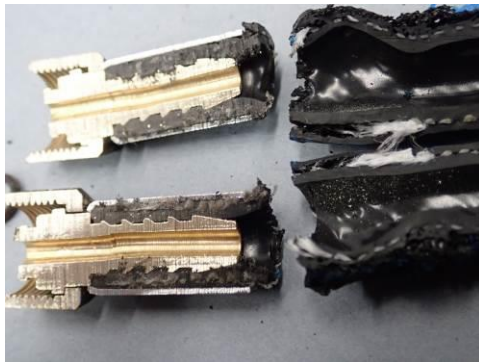


Figure 24. Subject Inlet Nut, Crimp, Hose.



Figure 25. Subject Inlet Hose at Failed Hole.

The torch bodies of the exemplar torch and the subject torch were not to be sectioned or examined at this time. The sectioning of the subject and exemplar torch bodies was reserved for future work.

The subject and exemplar torch and hose assemblies were photo documented and prepared for ESI lab evidence storage. Figures 26 - 27.



Welding & Joining Management Group

FORENSIC EXPERTS • METALS TESTING



Figure 26. Exemplar & Subject Fitting Pieces for Storage.



Figure 27. Exemplar & Subject Assemblies for Storage.

Following the destructive testing at ESI on October 18th, I tested an exemplar (Italian-made) propane gas supply hose from my exemplars in my laboratory on October 29th. The Exemplar hose that I tested (Italian-made) fractured at the torch body inlet connection fitting in a brittle manner after 20 minutes at -40°F. The temperature of propane gas after vaporization was listed in NFPA 58 as -44°F. (Refs 1)

2001 PROPANE TORCH RECALL

I reviewed the United States Consumer Product Safety Commission (CPSC), CPSC Harbor Freight Tools voluntary recall of about 500 propane torches, by Harbor Freight Tools of Camarillo Calif, Propane Torches, Release #01-139b. The propane torch measuring about 22.5 inches long, comes as a "kit" with a wand, flow valve, turbo blast trigger, hard rubber grip and hose that attached to propane. Writing on the hose reads, "IN-8MM OUT-13MM BURST 525 PSI PRESSURE WORK 150 PSI Made in China." Problem: The hose that comes with the propane torch can crack or burst, presenting a fire and explosion hazard. The link to the CPSC recall follows:

<https://www.cpsc.gov/Recalls/2001/cpsc-harbor-freight-tools-announce-recall-propane-torches>

PLAINTIFF'S CRYOGENIC THERMAL ASSESSMENTS – HOSE PROPERTIES

On January 10th and 11th, I obtained 15 exemplar Greenwood Propane Torch Item# 91033 assemblies that consisted of the torch body, handle, burner, and hose (Tecnotubi-LP-Gas, Propane, Made in Italy). I also obtained 6 exemplar hoses (Chuan Hseng CHH0251 5/16" L.P. / Nat Gas Hose 350 PSIG MAX, WP CSA 8.3 / UL 21, Made in China.) which were provided to me by Plaintiff's counsel after he received them in response to Plaintiff's discovery requests to Defendant. In my laboratory, 21 hose pieces were subjected to low temperature, cryogenic testing using a CVN specimen test freezer with a calibrated thermometer. The purpose of the low temperature testing was to assess and document the ductile-to-brittle-transition-temperature (DBTT) properties of the hoses as cause for the hose failure.

The standard, NFPA 58, Liquefied Petroleum Gas Code, Annex B Properties of LP-Gases, contains Table B1.2 (a) Approximate Properties of LP-Gases (English), lists properties of Commercial propane. The Initial Boiling Point at 14.7 psia of commercial liquid Propane was listed as -44°F. (Refs 6)

In the laboratory, low-temperature, cryogenic flow assessments were conducted with a filled 20# propane cylinder and a typical test set-up with a Greenwood Propane Torch Item# 91033, a "Made in Italy" hose, and later with a "Made in China" hose. The low temperature thermal measurements were the same for either type of hose. As propane vaporized and was discharged through the exemplar hoses for 20 minutes, the resultant temperature of the hose and the brass connection nut was -6°F as measured with a calibrated thermal indicator.

3756 Monarch Street • Frederick, Colorado 80516 • www.WJMG.com

OFFICE: 303-451-6759 • FAX: 303-280-4747 • TOLL-FREE: 800-987-9269



Welding & Joining Management Group

FORENSIC EXPERTS • METALS TESTING

The UL 21 Standard was stenciled on the "Made in China" hoses and the low rated service temperature in the UL 21 Standard was for safe hose use down to -40°F. Hoses were subjected for 20 minutes to incrementally increasing temperatures from -40°F to -6°F and bend tests for stiffness and ductility. All hoses tested fractured in a "brittle" manner at cryogenic temperatures up to 0°F. As the temperatures increased, became warmer, test hoses returned to ductility and did not exhibit brittle fracture during the bend test. (Refs 7, 8, 9)

The UL 21 Standard **was not stenciled** on the "Made in Italy" hoses and the low rated safe service temperature was considered as -40°F. Hoses were subjected for 20 minutes to incremental temperatures from -40°F to -6°F and bend tested for ductility. All hoses tested fractured in a "brittle" manner at increasing temperatures up to -6°F. As the temperatures increased, hoses slowly exhibited ductile properties and ceased fracturing in a brittle manner during bend tests at 0°F, the DBTT.

Both types of hoses were defective at cryogenic temperatures, below DBTT, 0°F. The hose connections failed in a brittle manner, in the crimp region of the hose at low temperatures, cryogenic, temperatures while in-service as a result of low-temperature brittle fracture when the temperature was below the DBTT, 0°F. As designed, the hoses are not reasonably safe.

The subject failed hose released pressurized propane that ignited. There was a defective crimp connection and broken threads in the hose at the brass connector crimp of the nut assembly that cannot be examined at this time due to the fire damaged hose region. Figure 1. Subject Hose - X-ray of Brass Connector Crimp Region and Fractured Hose.

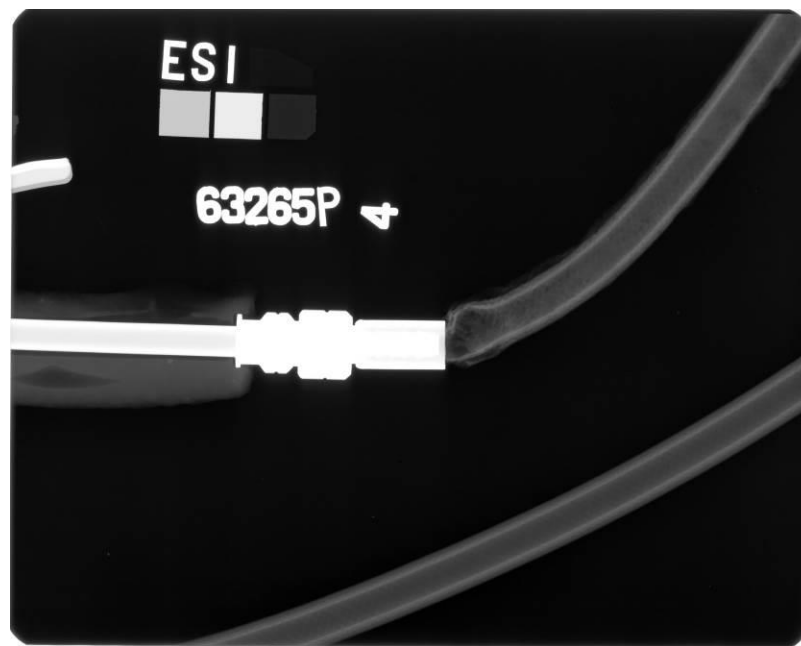


Figure 1. Subject Hose - X-ray by ESI of Brass Connector Crimp Region and Fractured Hose.

PLAINTIFF'S ELEVATED THERMAL ASSESSMENTS – INVERTED FLARE CONNECTION BRASS NUT

On January 10th and 11th, I obtained exemplar Greenwood Propane Torch Item# 91033 assemblies that consisted of the torch body, handle, burner, and hose (Tecnotubi-LP-Gas, Propane, Made in Italy). I obtained 6 exemplar hoses (Chuan Hseng CHH0251 5/16" L.P. / Nat Gas Hose 350 PSIG MAX, WP CSA 8.3 / UL 21, Made in China.). In my laboratory, 10 crimped connections from hoses with the inverted flare connection brass nut (brass nut) with an O-ring were heated to elevated temperatures that ranged from 500°F to 800°F, using a laboratory kiln and a calibrated thermal indicator. The purpose of the elevated thermal assessments was to assess and document the hose-end inverted flare connection brass nut thermal expansion properties and O-ring degradation as a cause for the observed loosened nut at ESI on October 18th.

3756 Monarch Street • Frederick, Colorado 80516 • www.WJMG.com

OFFICE: 303-451-6759 • FAX: 303-280-4747 • TOLL-FREE: 800-987-9269



Welding & Joining Management Group

FORENSIC EXPERTS • METALS TESTING

During the October 18th protocol, it was noted that the supply hose subject brass nut was slightly loose, less than finger-tight, at the inlet tube fitting. The subject brass nut looseness was not observed during initial examinations on June 6th. The Plaintiff testified in his interrogatory responses that he tightened the nut as specified by the manufacturer before using the torch. X-rays conducted by an ESI contractor on June 6, 2018, indicated that the brass nut was fully engaged and the inlet threads were fully inserted into the torch body.

According to Plaintiff's Interrogatory responses, the plaintiff used the propane torch continuously for 20 minutes. On a more probable than not basis and based on a reasonable degree of scientific certainty when the connection brass nut was exposed to the heat of the fire, the brass nut loosened as a result of the coefficient of thermal expansion of brass. (Refs 2)

The subject brass nut diameter was subjected to expansion during the elevated temperatures of the fire at a rate of 11 X 10⁻⁶ inches per degree Fahrenheit. (Refs 2) On a more probable than not basis and based on a reasonable degree of scientific certainty the temperature of the propane fire was equal to or greater than 1000°F (Ref 3) and the brass nut would be expected to expand approximately 0.011". (Refs 2) On a more probable than not basis and based on a reasonable degree of scientific certainty the brass nut became loose as a result of thermal expansion effects during the weed-burner torch fire. On a more probable than not basis and based on a reasonable degree of scientific certainty moving the torch post-accident also was a contributing factor to the loose nut. (Refs 2, 3)

On January 14th, 2019, I spoke with the Plaintiff and he informed me that the brass connection nut was suitably tightened with two flat-plate, wrenches provided in the box by Greenwood while he assembled the torch and brass connector hose. The loose nut was not apparent to me or acknowledged by the other expert in the June 3rd protocol and examinations at ESI. The loose Brass nut was not observed or noted at that time. Figure 2. X-ray of Inverted Flare Connection Brass Nut and Crimped Hose, O-Ring Space.

In the Plaintiff's laboratory, elevated thermal assessments were conducted with 10 typical inverted flare connections and brass nut assemblies. Individually, the inverted flare connection brass nut (brass nut) with O-ring were tightened securely to the torch connector with the wrench (from the box) as stated in the Owner's Manual instructions (#2).

The connection and brass nut was heated to an elevated temperature of 516°F, using a laboratory kiln and a calibrated thermal indicator. The elevated thermal measurements were the same for both types of hoses (Made in China and Made in Italy) with the connection brass nut. As temperature was increased to 516°F, the remnant hose in the crimped connection expanded and melted, while the brass nut expanded. The initial brass nut flat-to-flat measurement at 70°F was 0.742" and the final flat-to-flat measurement at 516°F was 0.769". The total expansion was 0.027" which exceeded the initial expansion estimate of 0.011" at 1000°F. Upon cooling down to 70°F, the brass nut had loosened to finger-tight condition. As the temperature of the remaining O-ring in the connection was increased to 820°F, the O-ring disintegrated, creating a void in the connection threads in the O-ring location in the assembly.

Both types (Made in China and Made in Italy) brass nuts were loosened at elevated temperatures less than 1000°F, the temperature of the propane flames and fire.

The elevated temperature testing documented the hose-end inverted flare connection brass nut thermal expansion properties and O-ring degradation that was related to the loosened brass nut observed at ESI on October 18th.

While the Plaintiff used the Greenwood Propane Torch, the inverted flare connection brass nut was suitably tight for 20 minutes of successful weed-burner use by Brandon Austin before the fire occurred. After the fire and incident, there was movement of the torch assembly, the brass nut connector and hose, the hose removal from the cylinder, transportation of the hose to ESI, and placement of the hose into storage. There is evidence that the above listed factors contributed to the loosening the brass connection nut identified on October 18, 2018.



Welding & Joining Management Group

FORENSIC EXPERTS • METALS TESTING

It is my opinion that the brass nut connection loosened as a result of thermal expansion and O-ring degradation at the elevated temperatures of the fire. The O-ring totally disintegrated in the laboratory at 800°F.

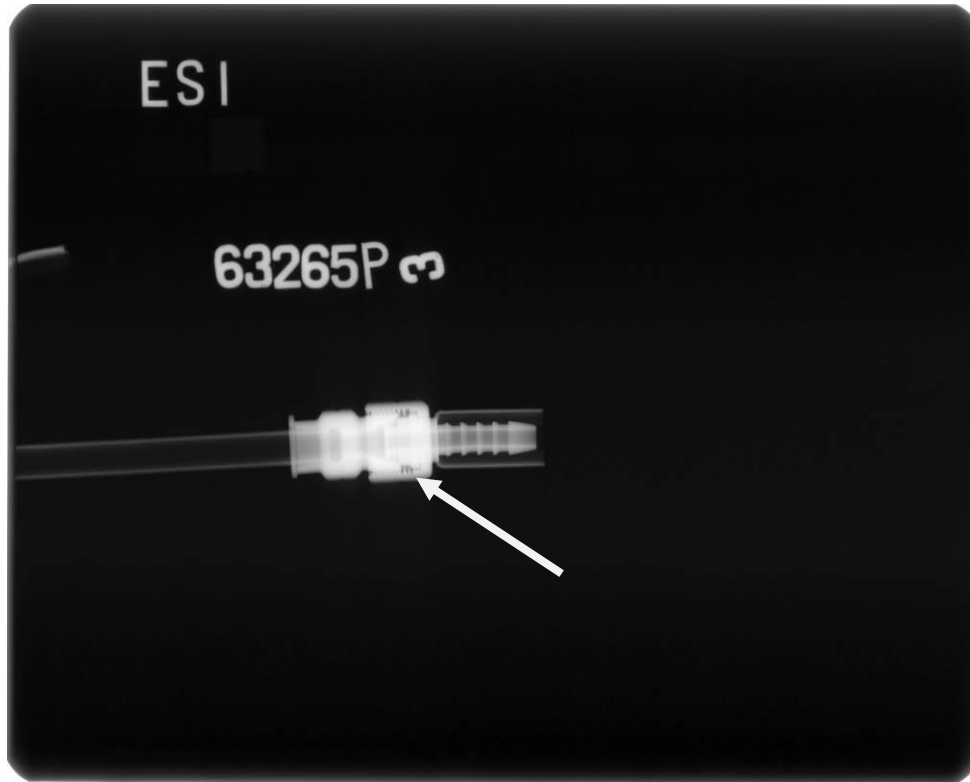


Figure 2. X-ray by ESI of Inverted Flare Connection Brass Nut and Crimped Hose, O-Ring Space (arrow).

NO WARNING

I had a telephone discussion with Brandon Austin on January 14th, 2019. He confirmed that there were no warnings in the Owner's manual that came with the subject torch and hose to avoid extended use of the propane torch for up to 20 minutes, avoid a maximum hose bend radius, or to visually inspect the hose during in-service use for cracks or defective conditions. I also reviewed the Owners' manuals and product packaging containing warnings for both Greenwood Propane Torches Item# 91033 and 61589 and I did not see any of those warnings. Mr. Austin informed me that if there had been a warning included in the Owner's manual for the torch that warned about the possibility of the hose cracking or breaking while using the torch during its recommended use, he would have never used the subject Greenwood Propane Torch and hose assembly. He also informed me that he no reason to expect the hose to fail in the manner that it did. Given that Harbor Freight recalled a similar torch in 2001 for a similar defective hose and given that a reasonable consumer such as Mr. Austin would not expect the torch and hose to fail in the manner that it did, a warning should have been provided. (Refs 8, 9, 10)

CONCLUSIONS

On a more probable than not basis and based on a reasonable degree of scientific certainty the subject supply hose material fractured and failed in a brittle mode after 20 minutes of cryogenic gas flow. The hose fractured near the metal termination of the hose and connection to the torch body. The fractured hose leaked propane gas near the inlet connection fitting at the torch body. The propane gas leaked at the fractured end of the supply hose and ignited without warning. The

3756 Monarch Street • Frederick, Colorado 80516 • www.WJMG.com

OFFICE: 303-451-6759 • FAX: 303-280-4747 • TOLL-FREE: 800-987-9269



Welding & Joining Management Group

FORENSIC EXPERTS • METALS TESTING

subject supply hose (Chinese-made) fractured and failed in a manner similar to that of the Harbor Freight Propane Torch hoses that were recalled in 2001. Despite the recall, still no warning was given in the Owner's manual for Greenwood propane torches 91033 or 61589. The propane gas supply hose was defective when used as intended by the torch supplier. Harbor Freight failed to provide hoses that complied with the UL21 standard making Greenwood torches 91033 and 61589 unreasonably dangerous.

The findings, conclusions and opinions expressed herein represent a reasonable degree of professional certainty as an engineering expert. These assessments were based on visual observations and information available to date. Conclusions and opinions may be modified as a result of additional findings revealed in the course of future examinations, inspections, nondestructive testing or failure analysis by myself or others.

A handwritten signature in black ink, appearing to read "Jesse A. Grantham".

Jesse A. Grantham, PhD, PE,
Principal Investigator



Welding & Joining Management Group

FORENSIC EXPERTS • METALS TESTING

References

1. National Fire Protection Association (NFPA) 58, Liquefied Petroleum Gas Code, 2014 Edition. Prepared by the Technical Committee on Liquefied Petroleum Gases and acted on by NFPA in June 2013. Table B.1.2 (a) Approximate Properties of LP-Gases (English), page 58-109.
2. Eugene Z. Avallone, Theodore Baumeister III, Marks' Standard Handbook for Mechanical Engineers, Tenth Edition 1996. Table 6.4.17 Composition and Properties of Selected Wrought Copper and Copper Alloys, pages 6-66 through 6-69.
3. National Fire Protection Association (NFPA) 921, Guide for Fire and Explosion Investigations, 2008 Edition. Prepared by the Technical Committee on Fire and Explosion Investigations, Table 5.6.5.1 Maximum Time Averaged Flame Temperatures Measured on the Centerline of Fires Involving a Range of Fuels., page 921-25
4. Torch Examination Protocol, September 7, 2018. Case Number 3:17-cv-06028-BHS, Brandon Austin (Plaintiff) v. Harbor Freight Tools, USA, Inc. (Defendant).
5. United States Consumer Product Safety Commission (CPSC), CPSC Harbor Freight Tools Announce Recall Propane Torches, Release # 1-139b. May 2, 2001. Link:
<https://www.cpsc.gov/Recalls/2001/cpsc-harbor-freight-tools-announce-recall-propane-torches>
6. National Fire Protection Association (NFPA) 58, Liquefied Petroleum Gas Code, 2014 Edition. Prepared by the Technical Committee on Liquefied Petroleum Gases and acted on by NFPA in June 2013. Table B.1.2 (a) Approximate Properties of LP-Gases (English), page 58.
7. UL 21 Standard for LP-Gas Hose - 2015, and UL 569 Standard for Pigtails and Flexible Hose Connectors for LP Gas, 2013.
8. Bates Number HFT 00117, Owner's Manual & Safety Instructions Greenwood Propane Torch Item 61589.
9. Owner's Manual & Safety Instructions Greenwood Propane Torch Item 91033. Greenwood 3491 Mission Oaks Blvd. PO Box 6009 Camarillo CA 93011.
10. Hose Safety Institute Handbook for the Design and Specification of Hose Assemblies. Version 1.2, August, 2015
11. Harbor Freight Tools USA Inc.'s Responses to Plaintiff's First Interrogatories December 2018
12. Harbor Freight Tools USA Inc.'s Supplemental Response to Plaintiff's First Requests for Production of Documents

EXHIBIT 5



Welding & Joining Management Group™

FORENSIC EXPERTS • METALS TESTING

Dr. Jesse A. Grantham Curriculum Vitae

EDUCATION:

Ph.D. Engineering, The Ohio State University, 1992.
M.S. Welding Engineering, The Ohio State University 1988.
M.B.A. University of Southwestern Louisiana, 1982.
B.S. Industrial Engineering and Management, Oklahoma State University, 1969.

EXPERIENCE:

1978 to Present

Expert in welding, brazing, soldering, cutting, metallurgy, corrosion, bolts and alloy verification. Welder and technician examinations and testing; develops metal testing instructions; and compliance reviews of cutting, welding, brazing and testing specifications. Welding Engineer for an ISO 9001:2000 certified metallurgical testing laboratory. Forensic welding specialist nationally recognized. Analyzes and explains complex technical issues in clear, understandable terms.

1975–1978 & 1990-1992

Welding Supervisor manufacturing offshore petroleum equipment and surface mining machinery.

1969 – 1975

Industrial Engineer for processes, products, labor management and safety programs.

REGISTRATIONS:

Senior Member #597 of the National Academy of Forensic Engineers (NAFE).
Registered Professional Engineer in 5 states (CO, GA, TX, WA, WY) with current NCEES records.
American Welding Society (AWS) Certified Welding Inspector (CWI) 98041061.
AWS Certified Welding Educator (CWE) 9807029E.
American Society of Nondestructive Testing (ASNT) Level III 95605.
AWS Certified Radiographic Interpreter (CRI 1511017N).

SPECIALTIES:

Expert testimony, litigation support and subrogation specialist in welding codes, contract compliance, construction defects, weld fractures, weld failures, accident investigations, product liability, corrosion assessments, warning labels, workplace safety, and hazards communications. Forensic cases include propane tank failures, acetylene cylinder explosions, refinery explosions, boiler failures, electrical failures, pipeline defects, industrial accidents, ladder failures, welding fumes and gases, welded equipment guards, pre-cast concrete defects, airplane component examinations, robot fixture defects, transmission tower collapse, personal injuries (burns), and OSHA interpretations.

TEACHING:

Active author and presenter.

Instructor – WJMI for AWS-CWI exam preparation, Magnetic Particle Testing (MT), Liquid Penetrant Testing (PT), Ultrasonic Testing (UT), and Radiographic Interpretations.

Instructor – ASM Int'l for metallurgy, processes, safety, and nondestructive testing (ndt).

Instructor – The Ohio State University for underwater welding, design, processes, safety and ndt.

Instructor – Columbia Basin College for metallurgy, welding processes, safety and ndt.

Instructor – Washington State University for manufacturing processes, welding, safety and ndt.

HONORS:

American Welding Society – Private Sector Instructor Membership Award; 2002, 2003, 2004, 2006
American Welding Society – Dalton E. Hamilton Memorial CWI of the Year District Award; 1998, 2001
American Welding Society – District Director Certificate Award; 1999
American Welding Society – Arsham Amirikian Memorial Maritime Welding Award; 1995
Also serves on numerous collegiate welding advisory committees and welding handbook committees.



3756 Monarch Street Frederick, Colorado 80516 • www.wjmg.com

OFFICE: 303-451-6759 • FAX: 303-280-4747 • TOLL-FREE: 800-987-9269



Welding & Joining Management Group™

FORENSIC EXPERTS • METALS TESTING

AFFILIATIONS:

Lifetime member, American Welding Society (AWS) Colorado Section
 Member, National Academy of Forensic Engineers (NAFE)
 Past President, Ohio State University Welding Engineering Alumni Society
 Associate Member, American Academy of Forensic Sciences (AAFS)
 Member, National Society of Professional Engineers (NSPE)
 Active member, locally and nationally, of professional societies, Colorado Bar Association, Wyoming Trial Lawyers Association, Colorado Claims Association and Denver Claims Association.

PUBLISHED BOOKS:

- Contracts, Billing & Getting Paid for the Forensic Engineer ISBN 978-1-934918-05-0, 1-934918-05-9. Denver, Colorado, Scudder Press, December 2012
- The Forensic Engineer Caught "Holding Harmless" ISBN 978-1-934918-04-3, 1-934918-04-0, Denver, Colorado, Scudder Press, December 2011
- Contract: A Guide for the Forensic Expert in the Welding Community, ISBN 978-1-934918-03-6, 1-934918-03-2, Denver, Colorado, Scudder Press, December 2010
- Spoilation: A Guide about Evidence for the Welding Community, ISBN 978-1-934918-02-9, 1-934918-02-4, Denver, Colorado, Scudder Press, December 2009
- Light, ISBN 978-1-934918-01-2, Denver, Colorado, Scudder Press, December 2008
- Choices, ISBN 978-1-934918-00-5, Denver, Colorado, Scudder Press, December 2007

ARTICLES, TECHNICAL ARTICLES:

- *Welding Code Non-Compliance – Precast Panel Collapse*, Welding Failures I Have Known, wjmg.com, 2015
- *Pressure Vessel Explosion after Weld Repairs - Subrogation*, Welding Failures I Have Known, wjmg.com, 2014
- *Trailer & Truck Frame Failures*, Welding Failures I Have Known, wjmg.com, 2014
- *Gas Pipe Failures at Condos Resulted in Explosion and Fire*, Welding Failures I Have Known, wjmg.com, 2014
- *Know the Code! Code Standards, Specifications, Verifications and Compliance*, The Welding Leader, TheWeldingLeader.com, 5/12/14
- *Important Welding Terms & Definitions*, The Welding Leader, TheWeldingLeader.com, 5/12/14
- *Who Cares About Metals*, The Welding Leader, TheWeldingLeader.com, 5/12/14
- *You Don't Have to Be An Engineer to Appreciate This Story*, The Welding Leader, TheWeldingLeader.com, 5/12/14
- *Commercial Welding Requirements*, The Welding Leader, TheWeldingLeader.com, 5/12/14
- *Making the Choice for Compliance*, The Welding Leader, TheWeldingLeader.com, 5/12/14
- *Professional Engineer (PE) versus Certified Welding Inspector (CWI)*, The Welding Leader, TheWeldingLeader.com, 5/12/14
- *Welding Codes, Standards, Specifications – Know the Authority Having Jurisdiction*, The Welding Leader, TheWeldingLeader.com, 4/20/14
- *Welding Design, a Guide for the Forensic Engineer*, The Welding Leader, TheWeldingLeader.com, 4/20/14
- *Educating Welders about Quality Welds*, The Welding Leader, TheWeldingLeader.com, 4/20/14
- *The Value of a Metals/Welding Expert*, The Welding Leader, TheWeldingLeader.com, 4/20/14
- *Using the Correct Materials and Consumables Solves Welding Problems*, The Welding Leader, TheWeldingLeader.com, 4/20/14
- *Oilfield Wells and Drill Pipe with Hardband Tungsten Particles*, Welding Failures I Have Known, WJMG.com, 3/20/14
- *Experts Never Agree – The Essential Vice*, Welding Failures I Have Known, WJMG.com, 3/20/14
- *The Case of the ATV A-arm Weld Fracture*, Welding Failures I Have Known, WJMG.com, 3/20/14
- *The Case of the Nitric Acid Reheater*, Welding Failures I Have Known, WJMG.com, 3/20/14
- *Defective Welds in Tower Arms of Power Transmission Poles*, Welding Failures I Have Known, WJMG.com, 3/17/14
- *Failed Girth Welds in a 30" Steam Line at an Overseas Power Plant*, Welding Failures I Have Known, WJMG.com, 3/11/14

3756 Monarch Street Frederick, Colorado 80516 • www.wjmg.com



Welding & Joining Management Group™

FORENSIC EXPERTS • METALS TESTING

- *Why Use an Experienced Forensic Welding Expert*, The Welding Leader, TheWeldingLeader.com, 6/20/13
- *Trends in Nondestructive Testing of Infrastructure*, NAFE – InterACTION, Spring/Summer 2010, Vol. 21, No. 1, pages 4-8.
- *The Value of a Forensic Engineer*, NAFE – InterACTION, Fall/Winter, 2009, Vol. 20, No. 2, pages 2-4.
- *Certified Nondestructive Testing Infrastructure*, NAFE – InterACTION, Spring/Summer 2009, Vol. 20, No. 1, pages 5-8.
- *No Nonsense with NDT, Nondestructive Testing Methods in Infrastructure*, Welding Update for Infrastructure, a Supplement to Practical Welding Today, May/June 2009, Jesse A. Grantham and Andrew McGoldrick, pages W12-W14.
- *Hazard Communication and Hazard Determination for Brazing and Soldering*, 2009 International Brazing and Soldering Conference, Orlando, Florida, April 2009
- *History: METALS a guide for the Forensic Engineer*, NAFE – InterACTION, Spring/Summer 2008, pages 2-5
- *Welding Design, a Guide for the Forensic Engineer*, InterACTION, Fall/Winter 2007, pages 5-7
- *The History of Welding*, InterACTION, Spring/Summer 2007, pages 3-5
- *First Line of Defense – Educating Welders to Achieve Quality Welds*, The Fabricator, April 2007, pages 48-49
- *Lines of Defense Against Weld Defects*, Fabricating & Metalworking, May 2006, Phil Walters, page 58
- *Quality as Part of the Contract, Blending NDT into the Welding Business*, Jesse A. Grantham Ph.D., P.E. Contributing Writer, Practical Welding Today, October 24, 2002
- *Forensic Engineering Analysis of Welding Process – Refinery Explosion*, Journal of the National Academy of Forensic Engineers, Volume XVIII, No. 1, page 25, June 2001.
- *Principles of Welding Productivity*, Practical Welding Today, March/April 2001.
- *Dealing with Warranty Costs in Welded Products*, Practical Welding Today, July/August 1999.
- *Supporting Welders with Sales, Estimating and Cost Accounting*, Practical Welding Today, March/April 1999.
- *Using the Correct Materials and Consumables Solves Welding Problems*, Practical Welding Today, January/February 1999.
- *Expanding Core Competency of Your Managers*, Practical Welding Today, 1999.
- *How to Estimate Direct Arc Welding Costs*, Practical Welding Today, September/October 1998.
- *The Welding Manager's Role in EHS Issues*, Practical Welding Today, July/August 1998.
- *Following Welding Codes and Standard in Part Design*, Practical Welding Today, May/June 1998.
- *Breaking the Rework Cycle, Identifying Factors for Improvement*, Practical Welding Today, April/May 1998, May/June 1998.
- *Eliminating Rejects and Rework. Reducing Cost by Doing it Right the First Time*, Practical Welding Today, March/April 1998.
- *Training the Welding Manager*, Practical Welding Today, January/February 1998.
- *Renewing Manager Involvement in Welding Leadership*, The Fabricator, November 1997.
- *Providing Welders with Authority and Support*, The Fabricator, November 1997.
- *Fitness-for-Service Design for Underwater 'Wet' Welds*, American Welding Society, Welding Journal, January 1994. C.L. Tsai, J. Grantham, Z. Feng, L. Soisson, L. Zirker, J. Papritan.
- *Effect of Surface Tension on SMAW Weld Profile*, American Welding Society, Welding Journal, Research Supplement, December 1992. L. Jiang, J. Grantham, C.L. Tsai, Z. Feng.
- *Development of an Electrode for Improved Fatigue and Impact Strength in Wet Welded Joints*, American Welding Society, Granjon International Award for Student Research, October 15, 1991.
- *Design of Connection Pad for Underwater Welding Tubular Structure Using Finite Element Method*, American Welding Society, Welding Journal, 1991. J. Grantham, C.L. Tsai, Z. Feng, L. Soisson.
- *Wet and Weld*, OSU News in Engineering, featured research report, The Ohio State University, College of Engineering, Columbus, OH, Fall 1989. C.L. Tsai, J. Grantham, L. Zirker, B. Boyce.
- *Welding Predictability*, OSU News in Engineering, The Ohio State University, College of Engineering, Columbus, OH, Summer 1989.

3756 Monarch Street Frederick, Colorado 80516 • www.wjmg.com

OFFICE: 303-451-6759 • FAX: 303-280-4747 • TOLL-FREE: 800-987-9269



Welding & Joining Management Group™

FORENSIC EXPERTS • METALS TESTING

- *Evaluation of Design and Fabrication Methods for Underwater Welding*, The Welding Innovation Quarterly, Volume VI, No. 1, Cleveland, OH, 1989. J. Grantham, C.L. Tsai, Z. Feng.
- *OSU Proficiency in Submerged Arc Welding*, American Welding Society, Welding Journal, page 50, October 1988.

REPORTS AND TECHNICAL PAPERS:

- *Forensic Engineering Assessments of a Robotic Welding System*, Journal of the National Academy of Forensic Engineers, Vol. XXIV No. 2, pages 91-98, December 2007
- *Forensic Engineering Investigations of Welding Code Compliance*, Journal of the National Academy of Forensic Engineers, Vol XXIV No. 1, pages 121-130, June, 2007.
- *Interfacial Tension Effects on Weld Bead Profiles*, American Welding Society, International Welding and Fabricating Exposition and Annual Convention, Professional Program, Technical Sessions, Session 17A, Process Physics II, Chicago, IL, April 27, 1996.
- *Strain Gauge Pressure Transducer Utilization*, A study for measuring internal rod pressure to 1000 psig in nuclear fuel rods. Proprietary for Siemens Power Corporation – Nuclear Division, 1996.
- *Alternative Manufacturing Process Concepts* for fuel rod welding, the effects of end cap multiple welds on Zircaloy-2 and Zircaloy-4 nuclear fuel rods. Proprietary for Siemens Power Corporation – Nuclear Division, 1995.
- *Qualification of Strain Gauge Pressure Transducer for Measuring Internal Rod Pressure in Nuclear Fuel Rods*, Siemens Power Corporation – Nuclear Division, EMF-PTA-574, November 11, 1994.
- *An Investigation of Alternative Manufacturing Processes used for Fuel Rod Welding*, Siemens Power Corporation – Nuclear Division, EMF-94-127 (P), Richland, WA, June 1994.
- *Development of Flux-Coated Electrodes for Underwater 'Wet' Welding*, ISOPE, Second International Offshore and Polar Engineering Conference, San Francisco, CA, June 14-19, 1992. C.L. Tsai, L. Jiang, J. Grantham, Z. Feng, W. Svekric, R. Holdren, L. Soisson.
- *Development of an Electrode for Improved Fatigue and Impact Strength in Wet Welded Joints*, American Welding Society, Convention and Exposition, International Award for Student Research, Chicago, IL, March 26, 1992.
- *Fundamental Study of Interfacial Tension Effects on Weld Bead Profile in the Shielding Metal Arc Welding Process*, publishing of dissertation, in-process, for the American Welding Society, Welding Journal. January 14, 1992.
- *Fitness-for-Service Design for Underwater 'Wet' Welds*, ASME Volume III-A, Materials Engineering, pages 197-204. Tenth International Conference on Offshore Mechanics and Arctic Engineering, Stavanger, Norway, June 23-28, 1991. C.L. Tsai, L. Zirker, Z. Feng, J. Grantham, L. Soisson, J. Papritan.
- *Development of an Underwater Shielded Metal Arc Welding Electrode with Improved Fatigue Strength in Wet Welded Joints*, Submitted to Ohio's Thomas A. Edison Program, The Ohio State University, Department of Welding Engineering, State of Ohio, Columbus, OH, June 1991. C.L. Tsai, J. Grantham, L. Jiang, Z. Feng.
- *A Proposal for the Comparison of Practical Mechanisms for Laser Beam Welding in Pressurized Argon Atmospheres*, The Ohio State University, Welding Engineering 894A, Laser Material Processing Colloquium, Columbus OH, May 24, 1991.
- *Wet Welding Electrodes, Formulas and Rationale*, The Ohio State University, Department of Welding Engineering, State of Ohio, Department of Development, Thomas A. Edison program, Columbus, OH, 1991.
- *Design Guide for Wet Welding the Tubular Connection Pad*, The Ohio State University Development Foundation, Sea Grant Program, Center for Lake Erie Area Research, OSU Welding Engineering Department, Columbus, OH, September 1990. J. Grantham, C.L. Tsai
- *Development of an Improved Underwater Shielded Metal Arc Welding Electrode with Improved Fatigue Characteristics*, State of Ohio, Department of Development, Thomas A. Edison Program, Department of Welding Engineering, OHSU-RS-139, Columbus, OH, June 1990. J. Grantham, C.L. Tsai, L. Jiang, Z. Feng, L. Soisson.
- *Evaluation of Design and Fabrication Methods for Underwater Welding in an Open Lake Environment*, American Welding Society, 71st Annual Convention, Anaheim, CA, April 22-27, 1990. J. Grantham, C.L. Tsai, Z. Feng, F. Vendetta, R. Strohl.
- *Evaluation of Design and Fabrication Methods for Underwater Welding in an Open Lake Environment*, ASME paper number OAME-90-861, Ninth International Conference on Offshore Mechanics and Arctic Engineering, Houston, TX, February 18-23, 1990. J. Grantham, C.L. Tsai, Z. Feng, F. Vendetta, R. Strohl.
- *Connection Pad Design for Underwater Tubular Structures*, The Ohio State University, Department of Welding Engineering, OHSU-TD-020, Columbus, OH, January 1990. C.L. Tsai, J. Grantham, Z. Feng, L. Soisson.
- *Determination of Residual Stress and Effects in Thick Section Weldments for Hydraulic Structures*, US Army Corps of Engineers, WI, 1989 – 1990. J. Jaeger, J. Grantham, C.L. Tsai, S.G. Lee, L. Shim, Z. Feng.



Welding & Joining Management Group™

FORENSIC EXPERTS • METALS TESTING

- *Evaluation of Residual Stress and Cracking in Weld Connections for Jumbo W-Shapes*, US Army Corps of Engineers, Mississippi River, Lock and Dam number 27, St. Louis, MO, December 1988 to December 1989. J. Jaeger, J. Grantham, C.L. Tsai, Z. Feng.
- *Evaluation of Design and Fabrication Methods for Underwater Welding*, Franz Theodore Stone Laboratory, Sea Grant Program, Center for Lake Erie Area Research, College of Biological Science, OHSU-TD-020-89, Columbus, OH, May 15, 1989. J. Grantham, C.L. Tsai, Z. Feng, F. Vendetta, R. Strohl.
- *A Comparison of Magnetoelastic Testing/Measurement for Uniaxial Stresses*, Determined by Barkhausen Noise versus Measurement of Residual Stresses by the Blind Hole Drilling Method, The Ohio State University, Welding Engineering Seminar, 1989.
- *A Review of X-Ray versus Isotope Radiation Sources for Real Time Radiographic Imaging*, The Ohio State University, Welding Engineering 635, Columbus, OH, May 27, 1988.
- *Laser Beam Production of Ultra-Fine Particles for Deposition of Metallic Thin Films*, The Ohio State University, Welding Engineering 704, November 15, 1987.
- *Structural Inspection and Evaluation of the Existing Lock Gates on Inland Waterways*, US Army Corps of Engineers, Mississippi River, Lock and Dam number 27, St. Louis, MO, Columbus, OH. J. Jaeger, J. Grantham, C.L. Tsai, Z. Feng.

PRESENTATIONS AND SEMINARS:

- *"Careers in Welding Failure Assessments"*, AWS Colorado Section "Weld the Rockies" Symposium", Lincoln College of Technology, Denver, CO, March 13, 2015.
- *"Careers in Nondestructive Testing"*, AWS Colorado Section "Weld the Rockies" Symposium", Lincoln College of Technology, Denver, CO, March 13, 2015. (Q/A and Commentary on film by ASNT – Choose NDT Nondestructive Testing.)
- *"Why Do You Need an Arc Welding Procedure Specification?"*, Colorado AWS Section 039 Meeting, Denver, CO, January 8, 2015.
- *"Contracts, Billing Getting Paid"*, National Academy of Forensic Engineers Conference, Special Seminar, Newport Beach, CA, January 20, 2013.
- *"Oh, the Places You'll Go...When You Know Welding"*, Colorado AWS Section 039, Denver, CO, May 10, 2012.
- *Oilfield Welding Codes*, AWS Colorado Section "Weld the Rockies" Symposium", Lincoln College of Technology, Denver, CO, March 9, 2012.
- *Welding Codes, Standards, Specifications*, Rooney Engineering Lunch and Learn, Englewood, CO, December 13, 2011.
- *Forensic Engineer Guide to Weld Failures*, National Academy of Forensic Engineers Conference, Special Seminar, Las Vegas, NV, July 16, 2011.
- *Welding Metallurgy Forensics*, Solutions Before Solutions After, Golden, CO, June 21, 2011.
- *Guide to Procedure Qualification Record (PQR) & Welder Performance (WQTR)*, "Weld the Rockies" Symposium at Colorado School of Mines, Denver, CO, March 11, 2011.
- *Contracts*, National Academy of Forensic Engineers Conference, Tucson, Arizona, January 16, 2011.
- *The Forensic Engineer Caught "Holding Harmless"*, National Academy of Forensic Engineers Conference, Orlando, Florida, July 17, 2010.
- *Guide to Arc Welding Metallurgy of Carbon Steel Alloys*, "Weld the Rockies" Symposium at Colorado School of Mines, Denver, CO, March 12, 2010.
- *A Guide for Metal Assessments and Spoliation Issues*, Rocky Mountain Property Claims Association, Denver, CO, September 10, 2009.
- *Forensic Engineering Assessments of Ruptured Acetylene Cylinders*, National Academy of Forensic Engineers Conference, St. Louis, Missouri, July 18, 2009.
- *Hazard Communication and Hazard Determination for Brazing and Soldering*, 2009 International Brazing and Soldering Conference, Orlando, Florida, April 2009
- *Storage, Spoliation, Disposal & Evidence Ownership*, National Academy of Forensic Engineers Conference, Special Seminar, Austin, Texas, January 18, 2009.
- *A Guide for the Forensic Engineer*, ASM International Rocky Mountain Chapter, Denver, Colorado, November 6,



Welding & Joining Management Group™

FORENSIC EXPERTS • METALS TESTING

2008.

- *Forensic Engineering Use of Medical Expert Information in Welding Fume Assessment*, National Academy of Forensic Engineers Conference, San Juan, Puerto Rico, January 6, 2008.
- *Safety in Cutting, Brazing & Welding with Acetylene & Oxygen*, AWS 36th International Brazing & Soldering Symposium, Chicago, IL, November 13, 2007.
- *Forensic Engineering Assessments of a Robotic Welding System*, National Academy of Forensic Engineers Conference, Denver, CO, July 28, 2007.
- *Safety in Cutting and Welding with Acetylene and Oxygen*, World Safety Organization, 20th Annual Health and Safety Conference and Exposition, Denver, CO, May 14-16, 2007.
- *(Welding) Failures I have Known*, American Welding Society, Colorado Section 039, Denver, CO, May 10, 2007.
- *Forensic Engineering Investigations of Welding Code Compliance*, National Academy of Forensic Engineers, Ponte Vedra, FL, January 7, 2007.
- *Forensic Catastrophic Investigation of Welding, Weld Failures & Inspection. Weld Failure Analysis & Prevention*, American Society of Nondestructive Testing, Denver, Colorado, September 12, 2006.
- *The Correct Processes for Visual Testing*, Welding & Joining Management Institute (Course 18), Westminster, CO, February 3, 2006.
- *Welding Hazards – Gases & Fumes*, World Safety Organization, 18th Annual Health and Safety Conference and Exposition, Denver, CO, May 2, 2005.
- *What Every Detailer, Fabricator & Erector Should Know About Welding*, Rocky Mountain Steel Construction Association, Inc., Denver, CO, January 25, 2001.
- *Forensic Engineering Analysis of Welding Process – Refinery Explosion*, National Academy of Forensic Engineers, Los Angeles, CA, January 20, 2001. J. Grantham, T. Beard
- *Business Strategies for Welding*, American Welding Society, Chicago, IL, April 26, 2000.
- *How to Reduce Automated Welding Costs with Real-Time Welding Data*, FABTECH International, Session on Automated Robotic Welding, November 14-18, 1999.
- *Business Strategies for Welding – the Nonwelder's Seminar*, The Fabricators and Manufacturers Association International, San Diego, CA, September 22, 1999.
- *Welding Inspection for Nonwelder's*, Welding & Joining Management Group, Denver, CO, August 1999 and February 2000.
- *How Welds Affect Safety*, World Safety Organization, Thornton, CO, June 25, 1999.
- *Tips for Managing the GMAW Process*, Welding & Joining Management Group, Denver, CO, June 1, 1999.
- *Six Steps to World-Class Welding Management*, Fabricators and Manufacturers Association International, Technical Conference, March 23, 1999, April 14, 1999.
- *NDT Methods for World Class Manufacturing*, American Society of Nondestructive Testing, Pueblo, CO, November 10, 1998.
- *Tips to Showcase your Welding Operations for Customers*, FABTECH International, Conference Papers, Automated Robotic Welding, Session 302, Cleveland, OH, November 3-5, 1998
- *Six Steps to World-Class Welding Management*, Fabricators and Manufacturers Association International, Technical Conference, September 24, 1998, October 5, 1998.
- *How to Evaluate Welding Contractors for Your Project*, National Society of Professional Engineers, Continuing Education Program, Tulsa, OK, July 26, 1998.
- *Welding: Land of Opportunities*, American Welding Society Colorado Section 039, Denver, CO, March 12, 1998.
- *Hot Stage Microscope Evaluations of Molten Slag and Weld Profiles*, Graduate Seminar, Colorado School of Mines, Golden, CO, January 29, 1998.
- *Stainless Steel Pipe – Root Welds*, National Association of Corrosion Engineers, Annual Corrosion Short Course, Colorado Springs, CO, January 28, 1998. J. Grantham, D. Culbert.
- *How to Totally Manage your Welding and Maximize Profit*, Welding & Joining Management Group, West, October 1997.
- *Introduction to Engineering Aspects of Underwater Welding*, Utah State University, College of Engineering, Logan,

3756 Monarch Street Frederick, Colorado 80516 • www.wjmg.com

OFFICE: 303-451-6759 • FAX: 303-280-4747 • TOLL-FREE: 800-987-9269



Welding & Joining Management Group™

FORENSIC EXPERTS • METALS TESTING

UT, May 19, 1995.

- *Managers, Engineers and Welders*, Institute of Industrial Engineers, Columbia Basin Section, Richland, WA, March 16, 1995.
- *Wet Welding Electrodes, Formulas and Rationale*, American Welding Society, 72nd Annual Convention, Granjon International Competition, Chicago, IL, 1992.
- *State of the Art Review, Fluxes and Slags in Arc Welding Carbon Steel*, Welding Engineering Design Group Seminar, The Ohio State University, Welding Engineering Department, Columbus Ohio, February 27, 1992.
- *Evaluation of Design and Fabrication Methods for Underwater Welding in an Open Lake Environment*, American Welding Society, 71st Annual Convention, Anaheim, CA, April 22-27, 1990. J. Grantham, C.L. Tsai, Z. Feng, F. Vendetta, R. Strohl.
- *Evaluation of Design and Fabrication Methods for Underwater Welding in an Open Lake Environment*, ASME paper number OAME-90-861, Ninth International Conference on Offshore Mechanics and Arctic Engineering, Houston, TX, February 18-23, 1990. J. Grantham, C.L. Tsai, Z. Feng, F. Vendetta, R. Strohl.

WORKSHOPS AND VIDEOS:

- *Underwater Welding Codes Workshop*, The Ohio Underwater Welding Center, Lake Erie, OH, August 31 – September 1, 1999
- *Underwater Welding, Cutting and Inspection Workshop, Underwater Welding Codes*, The Ohio State University, Department of Welding Engineering, Fawcett Center for Tomorrow, Columbus, OH
- *Commentary Video on Nuclear Reactor Underwater Repair at the Susquehanna Plant for Pennsylvania Power and Light*, The Ohio State University, Welding Engineering and Nuclear Engineering, Columbus, OH, Winter 1990. J. Grantham, J. O'Sullivan.
- *The Ohio State University Welding Engineering Recruitment Video*, distributed to area high schools, colleges and universities throughout the United States and abroad, The Ohio State University, Columbus, OH, Summer 1989. Production and coordination, C.L. Tsai, J. Grantham.
- *Underwater Welding Video of Lake Erie Underwater Welding Field Tests*, The Ohio State University, Columbus, OH, Winter 1989. Production and editing, J. Grantham, C.L. Tsai.
- *ASME Section VII Pressure Vessel Manufacturers and Quality Assurance Personnel*, GESI, Lafayette, LA and Tyler, TX, 1978-1987. Development of course materials and syllabus.
- *Corrosion Problems Concerning Welding*, IEEE, ASME, ASNT, Columbia Basin College, Applied Technology Division.

PATENTS:

- Underwater SMAW electrode, formula G4, Welding Consultants Inc. and OSU Engineering Experiment Station, in conjunction with the Thomas A. Edison Program, Ohio Department of Development, 1991. C.L. Tsai, J. Grantham, Z. Feng, L. Soisson, L. Jiang.

RESEARCH CONTRACTS:

- *Enhancing the Theoretical and Practical Competence of Welding Engineering*, Design Curriculum, International Association for Great Lakes Research, IAGLR/MOTT Fellowship Program, Ann Arbor, MI, 1989-1998. C.L. Tsai, J. Grantham.
- *Development of Designs for Mechanized Underwater 'Wet' Welding Processes*, Sea Grant, NOAA, The Ohio State University, Columbus, OH, April 16, 1994. C.L. Tsai, J. Grantham.
- *Development of an Engineering Database for New Underwater Flux-Coated Welding Electrodes for Use by Industry*, NOAA, Sea Grant Program, 1994. C.L. Tsai, J. Grantham.
- *Design Guide, Wet Welding, Flexible Tubular Connection Pad, R/OE-8PD*, The Ohio State University Development Foundation and Center for Lake Erie Research (CLEAR), Spring, 1990. (\$5000)
- *Development of an Underwater Shielded Metal Arc Welding Electrode with Improved Fatigue Strength in Wet Welded Joints*, State of Ohio, Thomas A. Edison Program, Ohio Department of Development and Welding Consultants Inc. 1989-1990. (\$50,000 + \$50,000 in-kind)
- *Evaluation of Design and Fabrication Methods for Underwater Welding in an Open-Lake Environment*, a program of research and improvements in underwater fabrication technology R/OE-5. Sponsored by Sea Grant, NOAA, Arcair Company, September 1987-August, 1989. (\$50,000)

3756 Monarch Street Frederick, Colorado 80516 • www.wjmg.com

OFFICE: 303-451-6759 • FAX: 303-280-4747 • TOLL-FREE: 800-987-9269

EXHIBIT 7

Case	Date	Project #	Description	Contact	Year	Sworn Testimony
David and Ann Michels vs. Polaris Industries Inc. et al, Chippewa County Case Number 11-CV-0056 (Plaintiff)	3/21/2013 - 1/5/2016	2013103	Failure analysis of failed weld on ATV arm	Tom Guelzow Guelzow Law Offices, Ltd. Eau Claire, WI	2013	Deposition (7/12/13)
Southern States (Dulany Industries) v Tampa Tank & Corrosion Control	4/12/2013	2013134	Evaluate corrosion failure of sulfuric acid storage tank floor	Jeffery Lewis Arnall Golden Gregory, LLP Atlanta, GA	2013	Deposition (9/23/13)
Mokihana (Matson Navigation Lines, Inc. and Subrogated Hull & Machinery Underwriters of S/S Mokihana v COSCO (Nantong) Shipyard Co., Ltd. ; International Centre for Dispute Resolution, Case No. 50125 T 0002212 (Defendant)	5/15/13 – 6/7/13	2013168	Assessment of defective weld repair of an access cover to the rudder of an ocean-going vessel	Marc A. Centor Cox, Wootton, Griffin, Hansen & Poulos, LLP San Francisco, CA	2013	Arbitration (6/6-7/13)
Eric Al Heinrich vs Master Craft Engineering, Inc. et al ; Case No. 1:13-CV-01899- PAB-GPG, United States District Court. (Defendant)	12/20/2013	2013477	Evaluation of flex plate for welding and weld safety	Allison Dodd / Randy Sego Lasater & Martin, PC Highlands Ranch, CO	2013	Deposition (10/30/14) Court (8/8/16)
Dan Anderson v Union Pacific Railroad ; District Court, Scottsbluff County, Nebraska; Case No. C110-288 (Defendant)	1/21/2014	2014029	Evaluate broken bolt in office chair	Torry Garland Union Pacific Railroad Company – Law Department Denver CO	2014	Deposition (2/16/15) Court (7/22/15)
Susan Strouse, et al v A W Chesterton Company, et al, Alameda County Superior Court Case Number RG13671981 Client: RPI Company (Defendant)	3/18/14 – 8/22/14	2014104	Consulting regarding proper and safe practices while welding in a refinery	Duncan Lemmon Foley & Mansfield Oakland, CA	2014	Deposition (4/17/14)
Rosalie Smith v. Travelers Home and Marine Insurance Co., et al.; In the District Court of the Third Judicial District of the State of Utah, in and for the County of Salt Lake; Case No. 120903959 (Plaintiff)	7/11/2014	2014263 (2010421)	Leak in copper pipe	William M. Fontenot Fontenot Law, PC Bountiful, UT Brandee Bower Merlin Law Group Denver, CO	2014	Deposition (8/11/15)
George Nusser v REM Torque-Test, Inc. ; In the 79th Judicial District Court, Jim Wells County, Texas; NHSL File No. 36729.39; Cause No. 14-03-53024-CV	11/5/2015	2015394	Welder workplace injury related to oilfield vacuum truck repair	Erik L Krudop Naman Howell Smith & Lee, PLLC San Antonio, TX	2015	Deposition (2/3/17)

EXHIBIT 8



Welding & Joining Management Group

FORENSIC EXPERTS • METALS TESTING

Expert Retention Contract

1. **Parties.** This contract is made between Welding & Joining Management Group, ("Expert") and Pfau, Cochran, Vertetis, Amala PLLC, 403 Columbia Street, Suite 500, Seattle WA 98104 (Client") regarding expert consulting services and assessments related to a Plaintiff with personal injuries associated with operation of a propane torch. Expert agrees that Client shall be solely responsible for payment, and Expert will only look to Client for payment of any and all financial obligations under this Contract.
2. **Retention.** The parties agree that Expert will only become retained by Client once this contract has been mutually executed and Client has paid the initial non-refundable retention retainer specified in paragraph 4.b. Expert has no duties to Client until such time. Expert shall be deemed an independent contractor and is not an employee, partner, agent or engaged in a joint venture with Client.
3. **Expert's Fees and Expenses.**
 - a. The parties agree that the fee for time Expert spends on the case will be compensated at a rate of \$350/hour. The rate for time spent for depositions and sworn testimony is a minimum of \$1,400 (\$350/hour in a 4 hour increment) regardless of the actual length of the deposition. **Advance payment is required before delivery of reports. Advance payment is required before each deposition and sworn testimony.**
 - b. It is agreed that this specifically includes (but is not limited to) research, conferences, consultations with Client, reviewing documents, organizing documents, analysis, testing, responding to discovery requests, report writing, testifying, depositions, reading and signing deposition transcripts, local portal-to-portal travel, waiting time, preparing exhibits, preparing demonstrative aids, and preparation time for testifying at deposition, trial, hearing, arbitration or other venues. Expert's time will be tracked and invoiced to the hour. In any and all events, Client will be responsible for all reasonable out of pocket expenses including, but not limited to travel, testing, research, photographs, photo group processing, storage of evidence or documents, etc. Unless expressly agreed by the Expert in writing, any cost estimates for services stated are for the client's budgeting purposes only and are not quotes which are binding on the Expert.
4. **Payment Terms.**
 - a. All payments are to be made to:
Welding & Joining Management Group
P. O. Box 235
Frederick, CO 80530
Expert's Taxpayer ID# is: 84-1396821.
 - b. **The non-refundable retention retainer amount is \$1,400 and is due at the signing of this contract. Expert will apply the retainer to the final invoice of the engagement.** This non-refundable retainer amount is the minimum fee for 4 hours consulting by Expert and is earned upon receipt. This contract serves as your invoice for this retention retainer.
 - c. Expert agrees to invoice client no less frequently than monthly.
 - d. All invoices will be paid within 30 days - or sooner if so specified in this Contract.
 - e. Overdue invoices will accrue interest at a rate of 1.5% per month.
 - f. Fees for any time Expert is asked to reserve for testifying (at trial, hearing, deposition, arbitration or other venue) and preparation for said testimony must be paid in advance and 24 hours prior to the time reserved for the scheduled testimony. Expert is under no

FR 2-3-1-A Rev 4 Engagement Letter
Page 1 of 5



Welding & Joining Management Group

FORENSIC EXPERTS • METALS TESTING

contractual obligation to reserve the time or appear to testify and provide opinions unless Expert has received this payment in full at least 24 hours prior to the time reserved for the scheduled testimony.

- g. Client is responsible for collecting any and all deposition fees and expenses owed by other lawyers or parties. In the event Expert's deposition fees are reduced by court order, Client shall still pay Expert's full fee specified in paragraph 3. Payment to expert is required before each deposition begins and/or sworn testimony commences.
- h. **Expert will invoice Client upon completion of Expert's report(s). Advance payment is required before delivery of reports. All fees must be paid in full before a report is released to Client, other parties or anyone else.** Expert is under no duty to release a report until Expert has been paid in full for all work performed to date.
- i. Expert will invoice Client before scheduled testimony for any outstanding fees and estimated expenses for work performed to date or expenses. All such fees and expenses must be paid in full before Expert testifies. Expert is under no contractual duty to appear to testify and provide opinions until Expert has been paid in full for all outstanding services performed and expenses incurred on behalf of Client.
- j. **In the event that multiple firms are responsible for payments to Expert, Client is solely responsible for collecting any and all fees and expenses owed by other lawyers or parties and paying all amounts due to Expert. Expert cannot invoice other parties on the client's behalf.**

5. Fees for Late Notice Cancellation or Rescheduling of Testimony.

- a. Client understands that Expert will suffer damages from late notice cancellation or rescheduling of Expert's testimony and that since the precise amount of these damages would be difficult to determine, Expert shall instead be entitled to the cancellation and rescheduling fees specified in paragraphs 5.c and 5.d.
- b. The fees specified in paragraph 4.f. are 100% refundable to Client in the event Expert's scheduled testimony is cancelled or rescheduled with notice to Expert of 3 (three) or more business days.
- c. In the event Expert's scheduled testimony is cancelled or rescheduled with 1 (one) or 2 (two) business days' notice, Expert may retain a cancellation fee of 50% the amount from paragraph 4. f. The remaining amount will at Client's option be applied to future testimony or refunded to Client.
- d. In the event of same day cancellation or rescheduling of Expert's Testimony or if Expert's testimony is completed in less time than was reserved pursuant to paragraph 4. f., Expert may retain 100% of the amount specified in paragraph 4.f.
- e. In the event of any cancellation or rescheduling of testimony, Client shall be responsible for all non-refundable out of pocket travel expenses incurred by Expert such as airline tickets and hotel rooms.

6. Duties of Client. The Client's duties specifically include, but are not limited to:

- a. Abiding by the applicable rules of professional conduct.
- b. Making all payments as specified in Paragraphs 4 and 5 under the terms as specified in Paragraphs 4 and 5.
- c. Providing Expert with copies of or access to all non-privileged, arguably relevant documents, evidence and other materials in the underlying legal matter related to Expert's consulting.
- d. Notifying Expert of all parties and attorneys in the case so that Expert can check for conflicts of interest.
- e. Where circumstances reasonably allow, providing Expert with prompt notice of any

FR 2-3-1-A Rev 4 Engagement Letter
Page 2 of 5



Welding & Joining Management Group

FORENSIC EXPERTS • METALS TESTING

Daubert motions, *Frye* motions, motions in limine, or other pre-trial motions made by other parties or persons to restrict, exclude or in any way limit Expert's testimony or Expert's participation in the underlying legal matter.

- f. Obtaining Expert's advance approval (for accuracy) of the relevant portions of any and all answers to interrogatories, motions, expert designations or other documents which summarize Expert's qualifications, methodology, opinion(s) and/or anticipated testimony.
- g. Being available as reasonably requested to meet with Expert prior to anticipated testimony.
- h. Promptly notifying Expert of when and where Expert may be requested to appear to testify.
- i. Promptly notifying Expert of any issues related to paragraph 8.b. to which Client is or becomes aware of.
- j. Promptly notifying Expert of settlement or final adjudication of underlying legal matter.

7. Duties of Expert. The Expert's duties are:

- a. To truthfully represent Expert's credentials.
- b. To formulate with honesty and due care and truthfully express Expert's opinion(s) in those areas (and only those areas) where Expert feels qualified to render an opinion and where Client has requested an opinion. Client agrees that Expert's opinion(s) are not preordained, might be contrary to Client's position, and are subject to modification as a result of new or additional information.
- c. To cease work on the underlying legal matter and promptly inform Client whenever Expert has accrued unpaid fees and expenses totaling more than \$20,000. In this event, Expert shall not perform further work on the underlying legal matter until approval is given by Client.
- d. Expert is under no duty to provide and express opinions if Expert is given time deadlines or cost-based or other restrictions by Client that would not reasonably allow Expert to in good faith formulate and express his opinions with reasonable care.
- e. Subject to paragraph 7.d., to prepare a written report if Client requests one.
- f. Subject to paragraph 7.d. and to circumstances beyond the Expert's control, to meet all reasonable deadlines requested by Client.
- g. To retain and preserve (during this engagement) all evidence provided to Expert from the underlying legal matter unless Client gives written permission for destructive testing or the like.
- h. To be available on reasonable notice to testify.
- i. To be available on reasonable notice to consult with Client. Expert's cellular number is 303-588-5609.
- j. To work exclusively with Client in the underlying legal matter unless the parties mutually agree in writing otherwise.
- k. Upon receipt from Client of the list of attorneys and parties specified in paragraph 6.d., to within 30 days check for conflicts of interest with due care and within the same 30 day period to notify Client of any conflicts of interest discovered that preclude Expert's further involvement in the underlying legal matter.

8. Expert's Right of Withdrawal from Case. Expert shall have the absolute right to withdraw, without any liability, from the case if Client violates any of the duties specified in paragraph 6 above or if:

- a. Expert discovers a conflict of interest which precludes Expert's further involvement in the underlying legal matter.
- b. Expert discovers that because of legal restrictions Expert's involvement or testimony in the case could reasonably be deemed practicing Expert's profession without a license.



Welding & Joining Management Group

FORENSIC EXPERTS • METALS TESTING

9. **Withdrawal.** Notice of withdrawal under Paragraph 8 shall be in writing from Expert to Client. In the event of withdrawal, the parties agree that Client remains fully liable for all accrued but unpaid fees, expenses, and interest.
10. **Termination.** This contract shall be terminated upon written notice to Expert from Client at any time, by Expert's withdrawal pursuant to paragraph 8, at such time as Client is no longer involved in the underlying legal matter, or upon the settlement or final adjudication of the underlying legal matter. In the event of termination, Client is still responsible for all sums owed Expert.
11. **Document/Evidence Retention.** Expert shall have no duty to retain any documents, reports, evidence, transcripts, exhibits, e-mails, electronic files or other materials from the underlying legal matter for more than 30 (thirty) days following the termination of this agreement. Expert shall return (at Client's expense) all records and evidence in the underlying legal matter to Client if a written request to do so is received by Expert within the 30 (thirty) days following the termination of this agreement.
12. **Losses and Damages.**
 - a. **Right to Cure.** The parties agree that WJMG's sole liability to Client for any non-conforming Work and Client's sole remedy therefore shall be for WJMG to correct the item of defective services, written notice of which must be promptly given by Client to WJMG, after Client's discovery of any defect and within three months from the date that WJMG completes its Work.
 - b. **Losses Limited to Contract Price.** The parties agree that WJMG shall not be liable for damages in an amount that exceeds the Contract Price. The maximum damages that WJMG shall be liable for, under any circumstances, is the Contract Price. In no event shall WJMG be liable to Client for any loss, cost, claim, cause of action, action, damage or expense of any kind or nature, including, without limitation monetary losses, damages, fines, penalties, remedial obligations, costs, expenses, attorney fees, etc. ("Loss"), resulting from, incident to, connected with or arising out of the performance of the Work, or default of breach of this Contract or an associated Work Order, in a total amount greater than the Contract Price. Client hereby expressly releases WJMG from and against such Losses except in an amount equal to or less than the Contract Price. Client assumes the risk of all Losses in excess of the Contract Price and agrees to not sue or assert a claim, action or cause of action against WJMG or any person in excess of the Contract Price.
 - c. **No individual or Personal Liability.** The parties agree that WJMG's directors, officers, employees, agents, representatives, subcontractors and other such persons shall not be personally or individually liable for damages or be sued by Client. In no event shall WJMG's officers, employees, agents or representatives be personally or individually liable to Client for any loss, cost, claim, cause of action, action, damage or expense of any kind or nature, including, without limitation monetary losses, damages, fines, penalties, remedial obligations, costs expenses, attorney fees, etc. ("Loss") resulting from, incident to, connected with or arising out of the performance of the Work, or default of breach of this Contract or an associated Work Order. Client hereby expressly releases WJMG's directors, officers, employees, agents, representatives, subcontractors and other such persons from and against such Losses and agrees to not sue or assert a claim, action or cause of action against any such person. In the



Welding & Joining Management Group

FORENSIC EXPERTS • METALS TESTING

event of a Loss, Client's sole relief is against WJMG and not WJMG's directors, officers, employees, agents, representatives, subcontractors and other such persons in a personal or individual capacity.

- d. **No Consequential Damages.** The parties agree that in no event shall WJMG or its directors, officers, employees, agents, representatives, subcontractors or other such persons be liable to Client or anyone else for any indirect, special, incidental, punitive, exemplary or consequential damages, including, but not limited to, damages or losses for loss of production, loss of revenue, loss of profits, loss of business or business interruptions, loss of use of assets, or loss of product or facilities' downtime ("Damages") resulting from, incident to, connected with or arising out of the performance of the Work, or default or breach of this Contract or an associated Work Order. Client hereby expressly releases WJMG and such persons from and against such Damages and agrees to not sue or assert a claim, action or cause of action against any such person or equity. Client assumes the risk of all such Damages.

13. Airline Flights. All airline flights taken by Expert shall be direct, non-stop, business class where possible.

14. Disputes and Venue. Any controversy, claim or dispute arising out of or relating to this Contract, shall be resolved in a Weld County Court, State of Colorado. The law of the State of Colorado shall be the governing law. The final verdict will be enforceable in any state or federal court. Client shall be responsible for payment of attorneys' fees and expenses associated with the Expert's efforts to collect monies owed under the terms of this Contract.

15. Miscellaneous. Each party agrees that it may not assign its interest, rights or duties under this Contract to any other person or entity without the other party's prior approval. (Expert is under no duty to work for successor firms on the underlying matter.) The performance of this contract by either party is subject to acts of God, death, disability, government authority, disaster or other emergencies, any of which make it illegal or impossible to carry out the agreement. It is provided that this contract may be terminated for any one or more of such reasons by written notice from one party to the other without liability. If either party agrees to waive its right to enforce any term of this contract, it does not waive its right to enforce any other terms of this contract. This written contract represents the entire understanding between the Expert and Client. **The individual signing this contract on behalf of Client represents and warrants that he/she is duly authorized to bind Client.**

Welding & Joining Management Group
EXPERT, by

Signature

Jesse A. Grantham, Expert

Print Name

Date:

Pratt, Cochran, Vertetis, Amala, PLLC
CLIENT AUTHORIZED AGENT, by

Signature

Darrell L. Cochran

Print Name

Date: 3/13/2018